A COMPARATIVE STUDY OF THE CLINICAL & NEUROBEHAVIORAL PROFILE OF CHILDREN WITH SEIZURE DISORDER Vs HEALTHY CONTROLS IN A TERTIARY HEALTH CARE CENTRE

Dissertation submitted to

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with Partial fulfillment of the regulations for the award of the Degree of

MD PAEDIATRICS (BRANCH VII)

INSTITUTE OF CHILD HEALTH AND
HOSPITAL FOR CHILDREN
MADRAS MEDICAL COLLEGE
CHENNAI

MAY 2019

CERTIFICATE

This is to certify that the dissertation titled "**A COMPARATIVE STUDY OF THE CLINICAL & NEUROBEHAVIORAL PROFILE OF CHILDREN WITH SEIZURE DISORDER Vs HEALTHY CONTROLS IN A TERTIARY HEALTH CARE CENTRE"** submitted by **Dr.RAMESH KRISHNAN.B** 2016-2019 session at Madras Medical College to the Faculty of Pediatrics, The Tamilnadu Dr.MGR Medical University, Chennai, in partial fulfillment of the requirements for the award of M.D. Degree in Paediatrics (branch VII) is a bonafide research work carried out by him under our direct supervision and guidance.

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DECLARATION

This dissertation entitled "**A COMPARATIVE STUDY OF THE CLINICAL & NEUROBEHAVIORAL PROFILE OF CHILDREN WITH SEIZURE DISORDER Vs HEALTHY CONTROLS IN A TERTIARY HEALTH CARE CENTRE"** is a bonafide work done by **Dr.RAMESH KRISHNAN.B** at Institute of Child health Madras Medical College Chennai during the academic year 2016-2019 under the guidance of Prof. **Dr.REMA CHANDRAMOHAN MD., DCH,** Professor of Pediatrics, Institute of Child Health, Chennai – 600 008. This dissertation submitted to The Tamil Nadu Dr.M.G.R. Medical University, Chennai towards partial fulfilment of the rules and regulations for the award of M.D., Degree in Paediatrics, Branch(VII).

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DECLARATION

I, Dr.RAMESH KRISHNAN.B, solemnly declare that the dissertation titled "**A COMPARATIVE STUDY OF THE CLINICAL & NEUROBEHAVIORAL PROFILE OF CHILDREN WITH SEIZURE DISORDER Vs HEALTHY CONTROLS IN A TERTIARY HEALTH CARE CENTRE"** has been prepared by me under the guidance and supervision of Prof. Dr. Rema Chandramohan MD., DCH.,

This dissertation is submitted to The TamilNadu Dr. M.G.R. Medical University Chennai in partial fulfillment of rules and regulations for the M.D., Degree Examinations in Paediatrics.

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Place : Chennai

Date :

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Dear Dr.Ramesh Krishnan.B,

The Institutional Ethics Committee has considered your request and approved your study titled **"A COMPARATIVE STUDY OF THE CLINICAL & NEUROBEHAVIORAL PROFILE OF CHILDREN WITH SEIZURE DISORDER VS HEALTHY CONTROLS IN A TERTIARY HEALTH CARE CENTRE " - NO.07082017**

The following members of Ethics Committee were present in the meeting hold on **01.08.2017** conducted at Madras Medical College, Chennai 3

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We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

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CONTENTS

INTRODUCTON

Seizures are the most common neurologic disorder in children. [1]

A **seizure** is a sudden change in behaviour caused by electrical hypersynchronization of neuronal networks in the cerebral cortex. [2]

Epilepsy can be defined as: (when any of the following exist): [2]

- At least 2 unprovoked (or reflex) seizures occurring greater than 24 hours apart.
- 1 unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk after two unprovoked seizures (e.g.≥60%) occurring over the next 10 years. Examples: remote structural lesions such as stroke, CNS infection, or traumatic brain injury.
- Diagnosis of an epilepsy syndrome.

  The second criterion emphasizes the use of neuroimaging and EEG in the evaluation of patients with a first-time seizure (added by the ILAE working group in 2014)

Acute symptomatic seizure[3]: A seizure that occurs at the time of a systemic insult or in temporal association with a documented brain insult. Examples: metabolic abnormalities/ drug withdrawal/ stroke/ acute head injury/ encephalitis.

The time period within which a seizure may be called as an acute symptomatic has not been clearly defined. As per a consensus panel

recommendation, the following are considered:

●Within 1 week of stroke/ traumatic brain injury/ intracranial surgery/ anoxic encephalopathy

●At first identification of a subdural hematoma

●During the active phase of a CNS infection

●Within 24 hours any severe metabolic derangement

Acute symptomatic seizures generally carry a low risk for future epilepsy compared with unprovoked seizures.

Unprovoked seizure [3]-It refers to a seizure of any unknown etiology as well as one that occurs in relation to a pre-existing brain lesion or a progressive nervous system disorder.

Those unprovoked seizures that are determined to be due to an underlying brain lesion or disorder can also be called as **remote symptomatic seizures** [3]**.** The risk of future epilepsy is high compared with acute symptomatic seizures.

Reflex seizures [4] - those that occur secondary to sensory stimulus (e.g. flashing lights)

Status epilepticus [4] is defined as "continuous seizure activity or recurrent seizure activity without regaining of consciousness lasting for more than 5 minutes"

During a seizure, blood flow to the brain is increased. There is an increase in the consumption of oxygen and glucose, and production of carbon dioxide and lactic acid. In early stages child may have tachycardia,

hypertension, stress hyperglycemia ,and sometimes hypoxemia. If these seizures are prolonged, it may lead to permanent neurologic damage to the developing brain . The child may also have lactic acidosis, rhabdomyolysis, hyperthermia, and hypoglycaemia. Hence, immediate Airway management and seizure termination are the most important initial priorities in children with active seizure activity.

Classification of seizures:

Seizures are broadly classified as :

1) Generalized

2) Focal (previously known as partial)

GENERALIZED SEIZURES:

In generalized seizures, there is involvement of both the cerebral hemispheres and alteration in the level of consciousness. They may be either convulsive or nonconvulsive. Motor involvement(in convulsive type), is usually bilateral.

The following are classified under Generalized Type: [1] [5]

1) Tonic-Clonic (grand mal epilepsy):

   A tonic phase for 30 seconds characterised by uprolling of eyes, tongue bite, froth from mouth & bladder/bowel incontinence followed by Clonic movements of all limbs

2) Tonic: Only tonic phase without clonic component

3) Clonic: Clonic movement of all limbs

4) Myoclonic: Sudden jerky violent contractions of axial and appendicular muscles
5) Atonic: sudden loss of muscle tone and consciousness
6) Absence (petit mal epilepsy): Brief periods of unconsciousness (30 to 60 sec) without associated motor involvement.

FOCAL SEIZURES: [4]

1) Focal seizures without impairment of consciousness (simple partial) usually present as sensory seizures (auras) or motor seizures (tonic/clonic/atonic).
2) Focal seizures with impairment of consciousness (complex partial) are associated with automatisms and are usually preceded by aura.

SPECIFIC EPILEPSY SYNDROMES: [1] [4]

- Benign rolandic epilepsy, (age group of 3 to 10 years) is characterised by waking up in the middle of the night owing to a simple partial seizure. EEG shows centrotemporal spikes. No therapy is needed unless these seizures are frequent.
- Infantile spasms (West's syndrome) (age group of 4 to18 month) presents as sudden spasmodic jerking contractions of the head, trunk and extremities in clusters. Intellectual disability and tuberous sclerosis may be associated. EEG shows hypsarrhythmic pattern. ACTH, prednisone, sodium valproate, topiramate, vigabatrin (in tuberous sclerosis) are used in treatment.

- Lennox-Gastaut syndrome (age group 2 to 10 years) is characterized by a triad of developmental delay, multiple seizure types and the characteristic EEG (irregular, 1-2 Hz spike and slow waves with polyspike bursts). A combination of tonic, myoclonic, atonic, and absence seizures may occur that are intractable. Sodium valproate, felbamate, lamotrigine, topiramate, and ketogenic diet are used in treatment
- Juvenile myoclonic epilepsy (age group of 12-18 years) is characterised by myoclonic jerks on awakening (tonic/clonic or absence seizures may also occur).EEG has characteristic fast spike and wave discharges pattern. Sodium valproate, lamotrigine, topiramate, and zonisamide are used in treatment.

CAUSES OF SEIZURES: [1]

Selected important causes for seizures in children include :

- Infectious causes:
    - Meningitis/Encephalitis
    - Brain abscess
    - Neurocysticercosis
    - Febrile seizures
- Neurologic or developmental:
    - Congenital anomalies
    - Birth injury
    - Hypoxic-ischemic encephalopathy

    - Degenerative cerebral disease
    - Neurocutaneous syndromes
    - VP shunt malfunction
- Metabolic causes:
    - Hypoxia/ Hypercarbia
    - Hypocalcemia/ Hypomagnesemia
    - Hypoglycemia
    - IEM
    - Pyridoxine deficiency
- Traumatic or vascular:
    - Stroke
    - Head trauma
    - Cerebral contusion
    - Intracranial haemorrhage
    - Child abuse
- Drugs and Toxins
- Oncologic
- Idiopathic

SEIZURE MIMICS IN CHILDREN:

Whenever a child presents with a seizure, the most important part is to differentiate whether it is a true seizure or a seizure mimic. Usually there is no postictal phase following these events unlike true seizures.

Few important causes include: [1] [4]

- Disorders associated with altered consciousness:
    - Apnea
    - Syncope(neutrally mediated & cardiac)
    - Breath-holding spells
    - Migraine
    - Cardiac dysrhythmias
- Paroxysmal movement disorders:
    - Acute dystonia
    - Pseudo seizures
    - Benign sleep myoclonus
    - Spasmusmutans
    - Shuddering attacks
    - Tic disorders
- Sleep disorders:
    - Sleepwalking
    - Narcolepsy
    - Night terrors
- Psychologic disorders
    - ADHD
    - Hysteria
    - Hyperventilation
    - Panic attacks
- Gastroesophageal reflux (Sandifer's syndrome)

DIAGNOSIS:[1]

LABORATORY TESTING:

Basic laboratory testing for a child presenting with seizure should include:

- Glucose levels
- Serum electrolytes
- Calcium/ionized calcium
- Total/differential count
- Sepsis screening (in selected cases)
- Metabolic profile (in selected cases)
- Lumbar puncture (in neonatal seizures, in those who present with altered mental status, meningeal signs, or have a prolonged postictal period)

NEUROIMAGING:

- CT scan (in focal seizures/ Hydrocephalus/raised ICP/ neurocutaneous syndromes/trauma etc)
- MRI of the brain is much more sensitive than a CT scan (detection of vascular malformations and certain tumors).

ELECTROENCEPHALOGRAPHY :

EEG is needed in an acute setting only for children presenting with refractory seizures and in whom nonconvulsive status epilepticus is strongly suspected. An otherwise well child can be subjected to EEG as an outpatient. A normal EEG does not always rule out an epilepsy or an abnormal EEG does not always indicate epilepsy.

MANAGEMENT OF STATUS EPILEPTICUS:[6]

The first line management always should be focussed on stabilization of the airway, breathing, circulation (ABC) and additionally stopping the seizure activity. Keeping the airway open, administering oxygen therapy, supporting ventilation , securing an intravenous line, protecting the patient from self trauma are the initial key steps in management.

Algorithm for the management of status epilepticus:

Step 1: ABCs stabilization, establishing IV access,

IV glucose/ calcium/ pyridoxine (in neonates and infants)

Step 2: Lorazepam 0.1 mg/kg IV or

Diazepam 0.2mg/kg IV

If no iv access, consider diazepam 0.5mg/kg PR or buccal/nasal/IM midazolam 0.2mg/kg .If iv access still not available, intraosseous access could be tried

Step 3: Repeat one more dose of Lorazepam / diazepam(5-10 min)

Step 4: Consider Phenytoin 20mg/kg or fosphenytoin 20 PE(phenytoin equivalent)/kg IV (30 min)

Step 5: IV Valproate (1:1 diluted NS 20-40 mg/kg over 1-5 min; if required continuous infusion at a rate 5mg/kg/hr can be given)

OR

Phenobarbitone 20 mg/kg IV (Reassess airway/consider intubation if the airway is compromised/ respiratory depression develops)

Step 6: Transfer to ICU

Continuous infusion of midazolam (loading dose 0.2mg/kg followed by 0.1 mg/kg/hr; increase every 15 min upwards by 0.05 mg/kg/hr till control to a maximum of 2 mg/kg/hr) or propofol /pentothal infusion

Step 7: General anaesthesia

LONG TERM TREATMENT:[1]

The choice and duration of AEDs depends on multiple factors like the age of the child, the type of seizure, the risk of recurrence, and other predisposing factors. Those children with recurrent episodes of seizures need long term treatment with multiple antiepileptic drugs.

The ideal anticonvulsant for a child should be individualised:

1.The drug should be effective against the particular type of seizure. If multiple drugs are effective, the drug that is least toxic should be used.

2. Single drug that is effective is started at the lowest dose.

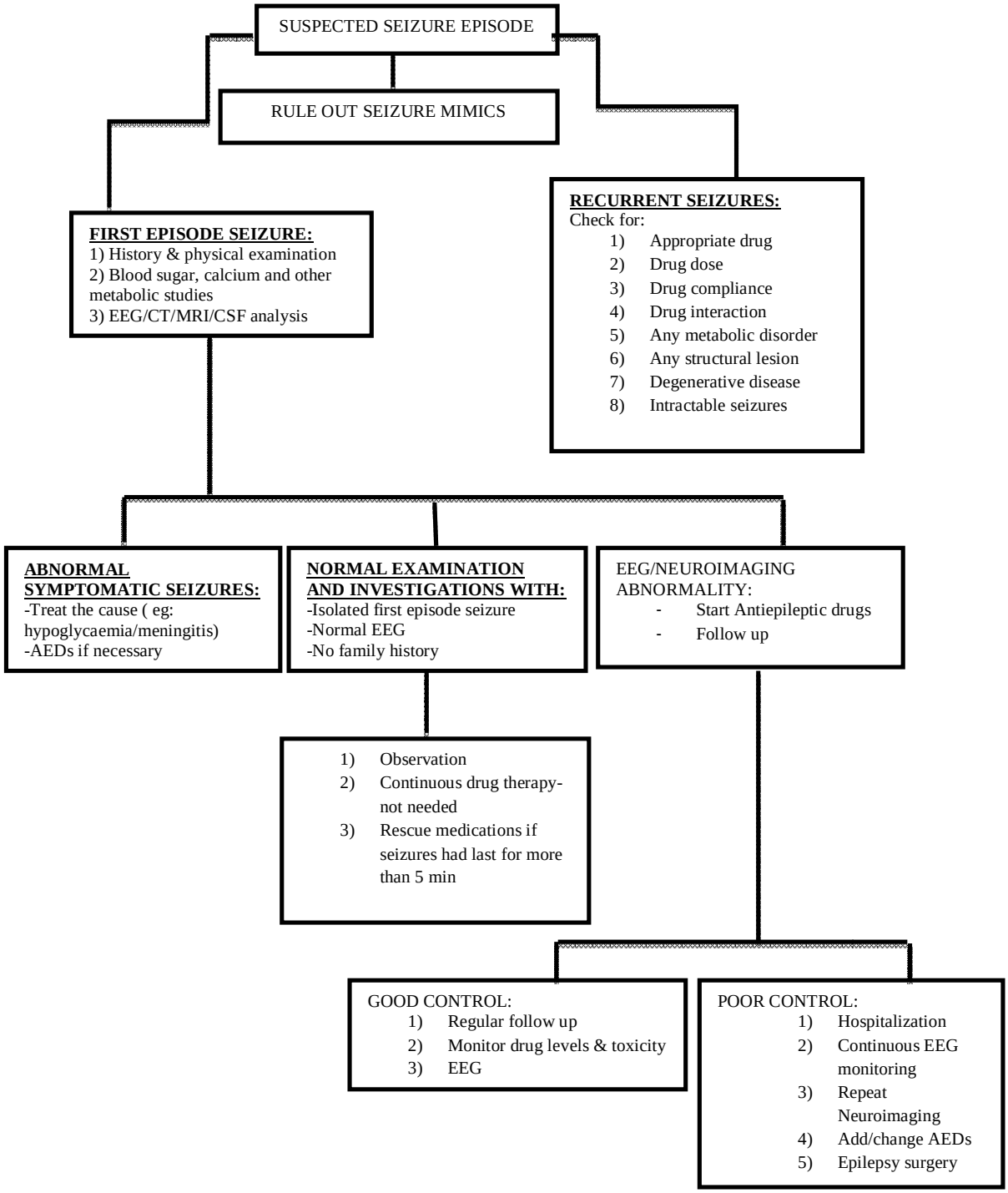
3.If seizures are well controlled, the same drug can be continued till a steady state is achieved, probably 5 times the t-half of the drug

4. If seizures are not controlled, the dose of same AED can be increased until control is achieved or any unacceptable side effects occur.

5. A second drug can be added if seizure control is poor and once they are controlled, the first drug can be slowly eliminated in order to maintain the child on monotherapy

- Those children who present with first episode unprovoked seizure who are otherwise well are scheduled for EEG and treated as out-patients provided warnings signs/symptoms are explained. Most of these children do not require anticonvulsant therapy on long term.
- Studies have shown that most of the recurrences of seizures are seen in the first 2 years after the initial episode and the chances of recurrences are more in those with abnormal EEG than those with normal EEG.
- The decision to start antiepileptic drug therapy and the choice of the agent should be made on the basis of associated factors like the chance of recurrences /any psychosocial implications against the side effects of drug therapy(changes in behaviour/ intelligence) and requires the consultation with a neurologist.

Approach to a child with suspected seizure disorder: [4]



COMMON ANTICONVULSANTS AND THEIR DOSAGES:[1] [4]

ANTIEPILEPTIC DRUG	FDA APPROVED INDICATIONS	MAINTENANCE DOSAGE (mg/kg/day)	DOSING INTERVAL	THEREPEUTIC LEVELS
1.Carbamazepine	Partial and GTCS	10-20	tid or qid	3-12 mg/L
2.Clobazam	LGS	10-20mg/day	bid or tid	60-200 ug/L
3.Clonazepam	Absence, myoclonic seizures, LGS	0.05-0.2	bid or tid	25-85 ug/L
4.Diazepam	Partial seizures	0.01-0.25 IV	bid or tid	100-700 ug/L
5.Ethosuximide	Absence seizures	20-30	bid or tid	40-100 mg/L
6.Gabapentin	Partial seizures	30-60	Tid	2-20 mg/L
7.Lacosamide	Partial seizures	4-12	bid	<15 ug/L
8.Lamotrigine	LGS, partial and GTCS	5-15	bid or tid	1-15 mg/L
9.Levitiracetam	Myoclonic, partial and GTCS	20-40	bid or tid	6-20 mg/L
10.Lorazepam	Status epilepticus	0.05-0.1	bid or tid	20-30 ug/L
11.Oxcarbazepine	Partial seizures	20-40	bid	13-28 mg/L
12.Phenobarbitone	Myoclonic, partial, GTCS, and status	3-5	bid or qid	10-40 mg/L
13.Phenytoin	Partial,GTCS&status	4-7	bid or tid	5-20 mg/L
14.Primidone	Partial & GTCS	10-20	bid or tid	4-13 mg/L
15.Topiramate	LGS, partial, GTCS	3-9	bid or tid	2-25 mg/L
16.Valproate	Absence, Myoclonic, partial & GTCS	15-40	bid or tid	50-100mg/L
17.Vigabatrin	Infantile spasms & partial seizures	50-150	bid	20-160 ug/mL
28.Zonisamide	Partial seizures	4-8	bid or qid	10-40 mg/L

Side effects of common anticonvulsants: [1] [4]

ANTI-EPILEPTIC DRUGS	SIDE EFFECTS:
1.Benzodiazepines	▪ Drowsiness/sedation ▪ Hyperactivity ▪ Drooling/increased secretions ▪ Apnea
2. Carbamazepine	▪ Leukopenia ▪ Weight gain ▪ Hyponatremia ▪ Steven-Johnson syndrome ▪ Agranulocytosis ▪ Aplastic anemia ▪ Hepatotoxic
3.Gabapentin	▪ Aggression/Hyperactivity
4.Lacosamide	▪ Diplopia ▪ Headache/dizziness ▪ Cardiac arrhythmias
5.Lamotrigine	▪ Headache/dizziness ▪ Ataxia ▪ Steven-Johnson syndrome
6.Levitiracetam	▪ Behavioural symptoms
7.Oxcarbazepine	▪ Headache/dizziness ▪ Rash ▪ Hypertrichosis ▪ Gingival hypertrophy ▪ Hyponatremia
8.Phenobarbitone	▪ Hyperactivity/distractability ▪ Mood fluctuations ▪ Hepatotoxic ▪ Steven-Johnson syndrome
9.Phenytoin	▪ Gingival hypertrophy ▪ Hirsuitism ▪ Nystagmus/ataxia ▪ Steven-Johnson syndrome ▪ Hepatotoxic
10.Primidone	▪ CNS toxicity ▪ Hepatotoxic ▪ Steven-Johnson syndrome

11.Topiramate	▪ Cognitive dysfunction ▪ Renal calculi ▪ Glaucoma
12.Valproate	▪ Weight gain ▪ Hyperammonemia ▪ Alopecia ▪ Hepatic & pancreatic toxicity
13.Vigabatrin	▪ Hyperactivity ▪ Retinopathy/ Visual field defects
14.Zonisamide	▪ Fatigue/dizziness ▪ Psychomotor slowing ▪ Ataxia

DRUGS OF CHOICE:

TYPE OF SEIZURE	DRUGS OF CHOICE
1.Neonatal seizure	Phenobarbitone
2.Cerebral palsy with epilepsy	Valproate,Levitiracetam (add on clobazam)
3.Infantile spasms	Prednisolone(or ACTH), Vigabatrin
4.Benign Rolandic epilepsy	None or Valproate, clobazam
5.Juvenile absence epilepsy	Valproate
6.Idiopathic Generalised Epilepsy(IGE)/ Juvenile Myoclonic Epilepsy(JME)-boys	Valproate, Levitiracetam, Lamotrigine
7. Idiopathic Generalised Epilepsy(IGE)/ Juvenile Myoclonic Epilepsy(JME)-girls	Levitiracetam, Lamotrigine
8.Focal epilepsy	Oxcarbazepine/carbamazepine, Levitiracetam, Phenytoin

OTHER TREATMENT MODALITIES:[1] [4]

KETOGENIC DIET:

- Those seizures that have failed to respond to the above antiepileptic drugs can be treated with ketogenic diet, which is found to be effective to some extent in the management of refractory tonic/atonic/myoclonic/atypical absence seizures and uncontrolled infantile spasms and Lennox-Gastaut syndrome.
- Initially, during the hospital stay, starvation is instituted until ketosis occurs. The child may go in for hypoglycaemia, hence blood sugars are to be monitored. The diet should contain 3 to 4 parts of fat added to 1 part of carbohydrate. Protein is later introduced with supplementation of vitamins and minerals.
- Vomiting , dehydration , sepsis and metabolic abnormalities like acidosis, hypoproteinemia, elevation of cholesterol/triglycerides, liver and pancreatic enzymes may occur. QT prolongation can occur and hence ECG monitoring is necessary

STEROIDS:

ACTH or Prednisolone (at a dose of 2mg/kg/day) because of their anti-inflammatory action are used in the management of :

- West syndrome
- Lennox-Gastaut syndrome
- Landau-Kleffner syndrome
- Myoclonic astatic epilepsy

They are usually given for a period of 2-3 months followed by tapering, but relapses are common during tapering. In such cases, therapy may be needed for 1 year.

IVIG:

It is found to effective in:

- West syndrome
- Lennox-Gastaut syndrome
- Landau-Kleffner syndrome

due to its anti-inflammatory action. The usual dosing is 2g/kg given over 4 days followed by 1g/kg once a month for 6 months.

EPILEPSY SURGERY:

Epilepsy surgeries have to be considered in patients whose seizures have failed to get controlled with 3 drugs, as the chance of being seizure free by AEDs falls below <10%. If surgeries performed at an earlier age, the function of that area(epileptogenic zone) are transferred to the nearby area. They are generally reserved for refractory seizures caused by:

- Cortical dysplasia
- Landau-Kleffner syndrome
- Hypothalamic hamartoma
- Tuberous sclerosis
- Sturge-Weber syndrome
- Rasmussen encephalitis

The procedures that are usually done are:

- Focal resection of the epileptogenic zone
- Hemispherectomy
- Multiple subpial transection
- Corpus callosotomy
- Vagal nerve stimulation

DISCONTINUATION OF DRUG THERAPY:[4]

This should be attempted only when the child is seizure free for 2 years and it is a benign epilepsy syndrome. Severe epilepsy syndromes may require a longer duration of therapy. The following factors are associated with higher frequency of relapse of seizures following discontinuation:

- Older age of onset
- Multiple seizure types
- Longer duration of seizures
- Child on more than 1 AED
- Abnormal EEG

The drugs should be tapered slowly over a period of 3-6 months. Abrupt withdrawal of the drug is associated with withdrawal seizures. Intranasal midazolam or rectal diazepam are prescribed for emergency use when the drugs are being withdrawn.

NEUROBEHAVIORAL COMORBIDITIES IN CHILDREN WITH EPILEPSY:[7]

The effects of epilepsy are as serious as the disorder itself. Among them, the important consequences are cognitive impairment and behaviour changes. Cognitive function includes the capacity of brain to solve problems/ memorise information/ focus attention and maintaining adaptive behaviour. Problems with Memory, mental slowing and inattention are the most common cognitive problems, resulting in poor school work in children

Studies have shown that most children with epilepsy have associated comorbidities.

Among them the most common ones are:

- Autistic Spectrum Disorder (ASD)
- Attention Deficit Hyperactivity Disorder (ADHD)
- Developmental Coordination Disorder (DCD)
- Emotional disorders, such as depression and anxiety

These conditions can further affect the learning and behaviour of the child and make the management of epilepsy a difficult process. Hence appropriate management of them is also mandatory.

The behavioural and cognitive effects of epilepsy depends on the following factors :

- Aetiology of the seizures:

  If the cause of seizures involves any underlying damage to brain, then it is related to cognitive dysfunction as well. In cortical dysplasia, abnormality is found in the cerebral Cortex and the degree of the intellectual impairment depends on the extent of the underlying malformation.

- Type of seizure:

  The type of seizure is also related to the degree of cognitive impairment. Generalised tonic–clonic seizures are found to be associated with more cognitive impairment than absence seizures and focal seizures. The risk is highest if the child presented with status epilepticus and has multiple seizure types.

- Nature of epilepsy syndrome
  - Idiopathic generalised epilepsies include benign myoclonic epilepsy of infancy, childhood absence epilepsy(CAE), juvenile absence epilepsy, juvenile myoclonic epilepsy(JME). JME, being the most common is associated with frontal lobe dysfunction, in which there is impairment of the executive functions like concept formation, mental flexibility, abstract reasoning, cognitive speed and planning.

- Idiopathic partial epilepsies include Benign childhood epilepsy with centrotemporal spikes (benign Rolandic epilepsy), in which the epilepsy is usually outgrown by children in their mid to late teens, though sometimes it is associated with deficits in reading/writing, auditory–verbal learning, visual perception, memory, fine motor, executive functions and attention
- Acquired epileptic aphasia ((Landau–Kleffner syndrome) is associated with language impairment,because of damage to auditory–verbal system.
- Lennox–Gastaut syndrome is associated with by intellectual disability and behavioural problems

- Location of the epileptogenic focus:
  - Verbal functions are affected in left-hemisphere seizures.
  - Visual memory and constructional disabilities are affected in right-hemisphere seizures
  - Temporal lobe epilepsy: Deficits in verbal memory is seen in left-temporal lobe epilepsy and deficits in visual memory in right-temporal lobe epilepsy.
  - Frontal lobe epilepsy: Deficits are seen in motor skills, attention, working memory, response inhibition, planning and psychomotor speed

- Seizure frequency:
    - Increase in the seizure frequency is associated with an increase in the intellectual impairment.
- Duration of illness:
    - Refractory temporal lobe epilepsy that persists for longer duration is associated with poor intellectual functioning.
- Age at onset:
    - Studies have shown that the younger the age of onset of seizure, the higher will be the adverse effect on the IQ.
- Effect of Anti-epileptic drugs:
    - Anti-epileptic drugs cause a decrease in the neuronal excitability thereby affecting the cognitive functioning.
    - Psychomotor speed, memory, language and mood are generally affected.
    - Polytherapy has been found to be associated with more adverse effects than monotherapy.
    - Those drugs that act on sodium channels have the least cognitive side-effects, whereas those with the GABAergic action have the most.
    - Older drugs like phenobarbitone, phenytoin, carbamazepine and valproate cause psychomotor slowing.

- Newer drugs like lamotrigine and oxcarbazepine (sodium channel blockers) may have a positive effect on learning and psychomotor speed.

Aggressive seizure control, choosing anti-epileptic drugs with good cognitive profiles, and appropriate treatment of comorbid conditions are necessary for the prevention of cognitive and behavioural disturbances in children with epilepsy.

In our study, we use **various questionnaires to screen for the presence of associated Neurobehavioral comorbidities in children with seizure disorder** and **confirmation will be performed by child psychiatrist**

The **questionnaires** that will be used are:

- **Strength & difficulties questionnaire**
- **Quality of life in childhood epilepsy questionnaire**
- **Child behaviour checklist questionnaire**
- **Developmental Coordination disorder questionnaire**

These questionnaires have got separate scoring systems and the data collected will be entered in an excel sheet. The sample questionnaires are attached in the annexures. Apart from these, a separate questionnaire is also used for obtaining the data about the seizure episodes.

REVIEW OF LITERATURE

1. Modage Anita et al[8] in her case control study on children with epilepsy (CWE) aged 5-12 years and their matched controls, applying Strength and Difficulties Questionnaire (SDQ), analysed and concluded that emotional symptoms, conduct problems, Hyperactivity & peer relationship problems were commoner in the cases than controls. The overall prevalence of behavioural comorbidities in epileptics was 39.1% as compared to 7.9% in non epileptics. Authors concluded that neurobehavioral comorbidities are significant in children with epilepsy and need to be addressed with appropriate interventions.
2. Kind et al[9] in his longitudinal study on epileptic children, analysed and concluded that the prevalence of lifetime epilepsy was 20.9 per 1,000 .Neurobehavioral comorbidities were very common in children with lifetime epilepsy compared to controls – the common conditions being ADHD, ASD and cognitive impairments, emphasising the need for incorporation of a comprehensive management plan for them.
3. Kari ModalsliAaberg et al[10] In her study on 6635 epileptic children out of 1,125,161 recruited, 80% of children with epilepsy had ≥1 comorbid disorder. Concurrent medical disorders (Gastrointestinal disorders/musculoskeletal disorders/chronic lower respiratory disorders etc.), neurologic disorders (cerebral palsy/ headache/ congenital neurologic malformations etc.) and developmental/psychiatric disorders

(Autism/ ID/ ADHD etc.) were commoner in epileptics compared to the children without epilepsy, stressing the need for addressing the comorbid diseases in this group. This study is in line with our study, though our sample population is comparatively much smaller.

4. Ike OluwaAbiolaLagunju et al[11] conducted a study in which 40 children with newly diagnosed epilepsy (24 males and 16 females) in the age group of 6-16 years were assessed for Intelligence quotient (IQ) using the Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV).On analysis, the mean IQ was in the normal range (FSIQ scores <85) for 52.5% (n = 21) of the participants and the rest (47.5%) had a score between the borderline and severe category for intellectual disability. Given the high prevalence of significant cognitive dysfunction, authors concluded that all children with epilepsy should have routine IQ assessment for early intervention and improved outcomes. This is comparable with our study, which has brought out a difference in IQ among the cases and controls, quantitatively.
5. Halma E et al[12] published a systematic review in which 13 Studies that included epileptic children from one month to 18 years of age and on levetiracetam, (plus other AEDs on a stable regimen) for at least two months were analyzed. Out of 727 patients using levetiracetam (finalized from3 RCTs), a total of 62 behavioural side-effects were noted in 203 patients. These effects led to discontinuation of levetiracetam in only two of 102 patients (2.0%). Hostility, nervousness

and aggression were reported most commonly. Authors concluded that children using levetiracetam have a risk of developing several behavioral side-effects (significant relative risk of 2.18).

6. Guilfoyle SM et al [13] conducted a retrospective study in which baseline psychological functioning of children(age = 2-11 years) and adolescents(age = 12-18 years) with new onset epilepsy were assessed using Behavior Assessment System for Children. The behavioral side effects following 1 month of AED therapy was assessed using Pediatric Epilepsy Side Effects Questionnaire. After analysis, authors concluded that children had significantly greater AED behavioral side effects (M = 25.08 ± 26.36) compared to adolescents (M = 12.36 ± 17.73). Also Higher hyperactivity / impulsivity at baseline significantly predicted higher AED behavioral side effects 1 month after AED initiation in both age groups. Sodium valproate and levetiracetam had significantly greater behavioural side effects compared to other AEDs.
7. Amir A. Sarhanet al[14] conducted a cross-sectional study in which 50epileptic children who were maintained on antiepileptic medications were administered Wechsler Intelligence Scale (IQ), Child Behaviour Checklist, and Developmental Profile-3 scale. On analysis, it was found that children with earlier onset, increased frequency of seizures, prolonged duration of epilepsy, those with generalized epilepsy &on polytherapy performed worse on all scales. Authors concluded that childhood epilepsy is associated with significant cognitive deficits,

intellectual decline, and behavioural problems, and are influenced by multiple factors. This study concurs with the inference of our study.

8. Dazhi Cheng et al[15] in his study on 37 childhood absence epilepsy [CAE] patients (divided into drug naive group and treated group) and 37 age- and gender-matched healthy control subjects using a computerized neuropsychological battery test for cognitive dysfunction concluded that neurocognitive dysfunction was more prevalent in CAE patients compared to the controls. The drug-naive subgroup had cognitive deficits in reasoning, visual attention, and executive function [typical functions of the frontal lobe]. Treated subgroup had cognitive deficits only in visual attention. No significant differences between groups were found for other cognitive tests. Authors concluded that CAE patients are more prone for frontal lobe dysfunction.
9. Ahyuda et al[16] in his retrospective study on co morbidities and risk factors associated with newly diagnosed epilepsy (7654 out of 6 million children) showed that neurobehavioral comorbidities were more prevalent in children with epilepsy than without epilepsy (60%, 99% CI = 58.1–61.0 vs. 23%, CI = 23.1–23.2). Also, epileptic children were more likely to have multiple comorbidities than those without epilepsy. Putative risk factors for epilepsy were detected in 28% of children with epilepsy. Those with both epilepsy and risk factors were more likely to have intellectual disabilities. Authors concluded that screening for

associated risk factors and neurobehavioral comorbidities should be mandatory in all children with epilepsy to have a better outcome.

10. Dave F. Clarke et al[17] in his prevalence study on Autism spectrum disorder in children attending a tertiary care epilepsy clinic using validated autism screening questionnaires (ASQ), found that approximately 32% of epileptic children fit the ASQ criteria for having ASD, most of whom were not previously diagnosed. Seizures also occurred earlier (approximately 2 years) in children who are at risk of having ASD. Authors concluded that children with epilepsy are at greater risk of having ASD (although confirmatory diagnostic evaluations are further needed) and so, their early diagnosis and intervention may improve the outcome.
11. Reilly C et al[18] conducted a prospective population based study on neurobehavioral comorbidities in children with active epilepsy aged 5-15 years. Out of 85 children who were enrolled into the study, 80% of children with active epilepsy had a DSM-IV-TR behavioural disorder and/or cognitive impairment (IQ<85). Intellectual disability (ID) (40%), attention-deficit/hyperactivity disorder (ADHD) (33%), and autism spectrum disorder (ASD) (21%) were the most common neurobehavioral comorbidities. Those who had seizures in the first 24 months compared with first seizures at 24 to 60 months or 61+ months and those on polytherapy were independently associated with ID and the presence of ID was more commonly associated with a diagnosis of

ASD. It was concluded that screening for neurobehavioral comorbidities should be an integral part of management in children with active epilepsy.

12. Claudia L. Kernan et al[19] in her comparative study of neurobehavioral profile of children with CPS, CAE and normal controls, concluded that the neurocognitive functioning of children with epilepsy was poorer than the controls in all domains of cognition. Of the two epileptic groups, children with CPS showed poorer performance than the CAE group in IQ assessment, whereas the executive functioning, verbal and visual memories were comparable between the two. The study highlights the importance of neuropsychological screening to identify subtle cognitive deficits in epileptic children.

13. Bektas G et al[20] conducted a prospective case control study on children aged 6 to 16years diagnosed with new-onset focal seizures and on treatment with either levetiracetam or sodium valproate. Psychosocial and behavioural functioning were assessed using Strengths and Difficulties Questionnaire (SDQ) and Children's Depression Inventory (CDI) at baseline, 1 and 3-months follow-up. Out of 101 children, 32 were on levetiracetam therapy, 19 were on valproic acid therapy and 50 were healthy controls .No statistically significant difference was observed in CDI & SDQ scores between patients and healthy subjects as well as those on levetiracetam or valproic acid ($p>0.05$). Thus, psychosocial and behavioural side-effects of

levetiracetam are not common at lower doses. Also, no significant difference was found between the valproic acid and levetiracetam treatment groups.

14. Chen B et al[21] conducted a study on the psychiatric and behavioural side effect (PBSE) profiles of antiepileptic drugs (AEDs) in children and adolescent patients with epilepsy. It was found that PBSEs and IPBSEs (PBSEs associated with Intolerability) occurred in 13.8% and 11.2% of patients, respectively. After analysis, authors concluded that those children who had a history of psychiatric condition, absence seizures, intractable epilepsy, or frontal lobe epilepsy are more likely to develop PBSE. These PBSEs (16.2%) and PBSEs associated with Intolerability (13.4%) appear to occur more frequently in patients taking Levetiracetam compared to other AEDs
15. Om P Mishra et al[22] conducted a case control study in which children with epilepsy were compared with unaffected controls (140 cases and 157 controls). Child Behaviour Checklist (CBCL) was used to assess the behaviour problems. On analysis it was found that the mean CBCL scores were significantly higher in cases than the controls, indicating the presence of clinically significant abnormal behaviour in epilepsy group. Also, it was found that the following factors have significant correlation with behavioural problems in both the age groups - younger age of onset, frequency of seizures, duration of disease and polytherapy.

16. Tanabe T et al[23] conducted a cross sectional study applying the strengths and difficulties questionnaire (SDQ) in 83 epileptic children in the age group of 4 to 16 years to screen for behavioural problems. On analysis it was found that the scores of the subscales ‘Hyperactivity’ ($p<0.0001$), 'peer problems'($p<0.0001$) and 'conduct problems' ($p<0.01$), were above the normal range in significant numbers of children. Also, these poor SDQ scores correlated with early age of onset of seizures. Thus, authors concluded that SDQ scores can be used to diagnose behavioural problems in children with epilepsy and these comorbidities should be addressed as early as possible for a better quality of life in such children.
17. NageshAdla et al[24] conducted a prospective observational study in which 104 children aged 4-13 years with epilepsy were recruited to assess the quality of life using QOLCE questionnaire. On analysis it was found that the mean overall QOL score was 46.82 ± 10.90 and was affected by the type of epilepsy, frequency of seizures, antiepileptic drugs and maternal education. Cognitive dysfunction and social impairment were found to be affected more severely. Authors concluded that the quality of life is weaker in children with epilepsy and the associated cognitive and social impairment need to be addressed.

18. Michael Freilinger et al[25] conducted a study in which 108 children aged 5 to 18 years with various epilepsy syndromes were recruited and CBCL questionnaire was administered to assess the prevalence of behavioural and emotional problems. On analysis, it was found that 22.2% of the study population showed behavioural or emotional problems of the moderate to severe type as measured by the CBCL total scores. It was found that higher CBCL scores were associated with those children who had an early age of onset and were on polytherapy. Therefore, the authors concluded that these psychosocial issues need to be addressed along with the treatment of epilepsy.
19. JayashreeNadkarni et al[26] conducted a cross-sectional study to identify the association of demographic and epilepsy variables with the QOL in children with epilepsy.102 children with epilepsy aged between 4 and 15 years were chosen and administered QOLCE questionnaire. The mean age of the study group was 8.75 ± 3.6 years, comprised of 61 boys and 41 girls. On analysis it was found that the overall QOL was affected more in children living in rural areas with lower socioeconomic status and belonging to older age group. With regard to disease characteristics, a poorer QOL was observed in children with increased seizure frequency, in those receiving polytherapy and on longer duration of treatment. Authors concluded that it is necessary to measure QOL in children with epilepsy apart from seizure control and

to initiate interventions to address the behavioural and emotional problems

20. Stuart D. W. Smith et al[27] conducted a study to detect the symptoms of Developmental Coordination Disorder (DCD) in children with Rolandic epilepsy, their siblings and normal controls. 18 children with rolandic epilepsy, 9 of their siblings, 17 controls all belonging to age group of 7-17 years with IQ>80 were administered Developmental Coordination Disorder Questionnaire (DCDQ). On analysis, it was found that 44% of children with RE came under the category of suspected DCD group, which was larger than the controls (χ^2=4.58, p= .032) and siblings (χ^2=3, p= .08). Therefore, it was concluded that the prevalence of symptoms of DCD was higher in children with RE compared to controls and siblings.

STUDY JUSTIFICATION

- The prevalence of neurobehavioral comorbidities in children with seizure disorder is on the higher side and these add significant burden as well as pose difficulty in treatment of the condition.
- Previous studies have shown that these comorbidities are usually under recognized and the interventions done to treat/ manage them have shown a good response.
- Most of the evidence of these comorbidities are obtained from studies done in developed countries and there is only limited data from developing countries.
- Therefore, screening of all children with seizure disorder for cognitive & behavioural difficulties is mandatory and it should be an integral part of management in childhood seizures.

OBJECTIVES

PRIMARY OBJECTIVE –

- To compare the clinical & neurobehavioral profile of children with seizure disorder versus healthy controls in a tertiary health care centre

SECONDARY OBJECTIVE –

- To compare the effect of single AED & multiple AEDs on the neurobehavioral outcome of children with seizures
- To co-relate the Sociodemographic characteristics with the epilepsy pattern in such children
- To describe the prevalence & pattern of behavioural problems in children with recent onset seizures & long standing seizure disorder

METHODOLOGY

- **STUDY DESIGN**- Case Control Study
- **STUDY SETTING-** Institute Of Child Health and Hospital For Children Egmore
- **STUDY PERIOD** –August 2017 to August 2018.
- **STUDY POPULATION**-

Inclusion criteria-

All children between 6-12 years of age diagnosed to have seizure disorder

- on single AED(seizure free for 6months)
- on multiple AEDs
- Age& sex matched healthy controls

Exclusion criteria-

- Children with Developmental Delay(all domains)
- Children with known neurological disorders
- children with known psychiatric illness
- Medical illness associated with behavioural abnormality

- **SAMPLE SIZE:** All children between 6-12 years of age diagnosed to have seizure disorder
  - on single AED(seizure free for 6months)-50
  - on multiple AEDs-50
  - Age & sex matched healthy controls-100.

CASE DEFINITIONS:

SEIZURE:

A **seizure** is a sudden change in behaviour caused by electrical hypersynchronization of neuronal networks in the cerebral cortex. [2]

EPILEPSY:

Epilepsy can be defined as: (when any of the following exist): [2]

- At least 2 unprovoked (or reflex) seizures occurring greater than 24 hours apart.
- 1 unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk after two unprovoked seizures (e.g.≥60%) occurring over the next 10 years. Examples: remote structural lesions such as stroke, CNS infection, or traumatic brain injury.
- Diagnosis of an epilepsy syndrome.

The second criterion emphasizes the use of neuroimaging and EEG in the evaluation of patients with a first-time seizure (added by the ILAE working group in 2014)

STUDY MANOEUVRE:

All children between 6-12 years of age **fulfilling the inclusion criteria:**

Diagnosed to have seizure disorder

1) on single AED(seizure free for 6months)

2) on multiple AEDs&

3) Age & sex matched healthy controls

Will be **screened for associated Neurobehavioral comorbidities using various questionnaires** after obtaining informed consent from parent/guardian and **confirmation will be performed by child psychiatrist.**

The **questionnaires** that will be used are:

- **Strength & difficulties questionnaire**
- **Quality of life in childhood epilepsy questionnaire**
- **Child behaviour checklist questionnaire**
- **Developmental Coordination disorder questionnaire**

These questionnaires have got separate scoring systems and the data collected will be entered in an excel sheet. The sample questionnaires are attached in the annexures.

STRENGTH & DIFFICULTIES QUESTIONNAIRE:

It contains 25 items totally placed as 5 items each in 5 scales and the parent version is administered. The scales are:

- Emotional problems scale
- Conduct problems Scale
- Hyperactivity scale
- Peer problems scale
- Prosocial scale

The scoring components are:

- Somewhat True
- Not True
- Certainly True

'Somewhat True' is scored as 1 always. 'Not True' and 'Certainly True' varies in each scale (zero or 2). For each of the 5 scales the score will range from 0 to 10.

Total difficulties score is calculated by summing up scores from 4 scales (Emotional problems scale + Conduct problems Scale+ Hyperactivity scale+ Peer problems scale). Pro-social scale is not taken into account. The score ranges from 0 to 40.A total difficulties score of :

  - 0-13 was normal
  - 14-16 was borderline
  - 17-40 was abnormal

- **Externalising scores**: The externalising score is the sum of the conduct and hyperactivity scales, and it ranges from 0 to 20.
- **Internalising score** is the sum of the emotional and peer problems scales and ranges from 0 to 20.

QUALITY OF LIFE IN CHILDHOOD EPILEPSY

QUESTIONNAIRE:

The following sub-scales are included under this questionnaire:

1. **Cognitive** functioning (includes 22 items)

2. **Emotional** functioning (includes 17 items)

3. **Social** functioning (includes 7 items)

4. **Physical** functioning (includes 9 items)

The Scoring is done as follows:

1. All items are recoded so that higher scores will indicate higher well-being.

2. These pre-coded numeric values are converted to a 0-100 point scale and responses are coded as 0, 25, 50, 75, 100. Higher scores will reflect a better quality of life.

3. The mean value of the items in each subscale is calculated.

4. The un-weighted mean of the four subscales is used to calculate the total score.

CHILD BEHAVIOUR CHECKLIST QUESTIONNAIRE:

This checklist contains multiple items that describe the child and is scored as follows:

0 -Not True

1 - Somewhat or Sometimes True

2 –Very True or often True

Age 6-11 years:

Cumulative score of: <38 – NORMAL

39-48 – BORDERLINE

>49 – CLINICALLY SIGNIFICANT

Age 12-18years:

Cumulative score of: <39 – NORMAL

40-51 – BORDERLINE

>52 – CLINICALLY SIGNIFICANT

DEVELOPMENTAL COORDINATION DISORDER QUESTIONNAIRE:

There are 15 items in this questionnaire which are grouped under the following sub scales:

- Control during movement (includes 6 items)
- Fine motor/ Handwriting (includes 4 items)
- General coordination (includes 5 items)

Each item is given a score ranging from 1 to 5 (1 being the lowest and 5 being the highest). The maximum total score is 75

Children Aged 5 years 0 months to 7 years 11 months

SCORE OF: 15-46 indication of DCD or suspect DCD

47-75 probably not DCD

Children Aged 8 years 0 months to 9 years 11 months

SCORE OF: 15-55 indication of DCD or suspect DCD

56-75 probably not DCD

Children Aged 10 years 0 months to 15 years

SCORE OF: 15-57 indication of DCD or suspect DCD

58-75 probably not DCD

Apart from these, a separate questionnaire is also used for obtaining the data about the seizure episodes.

STATISTICAL ANALYSIS:

- The data will be coded and entered in excel sheet.
- The study subjects namely seizure disorder and normal children were compared in respect of their clinical and neurobehavioral profile of continuous variables by student independent "t" test.
- The categorical variables were compared by χ^2 (Chi-square) test.
- Within the Seizure disorder group, those on monotherapy and polytherapy were compared by student independent "t" and χ^2 (Chi-square) test according to the type of variables.
- The P - values less than or equal to 0.05 ($P \leq 0.05$) were treated as statistically significant.

ETHICAL CONSIDERATION:

- The study was commenced after the ethical committee clearance.
- This study does not include any experimentation.
- Patients will be informed of the procedure done and consent will be obtained.

- Strict confidentiality will be maintained while analysing and presenting the data.
- No one will be receiving any benefit personal or professional from a commercial party directly or indirectly to the subject of this study.

OBSERVATION AND RESULTS

Results:

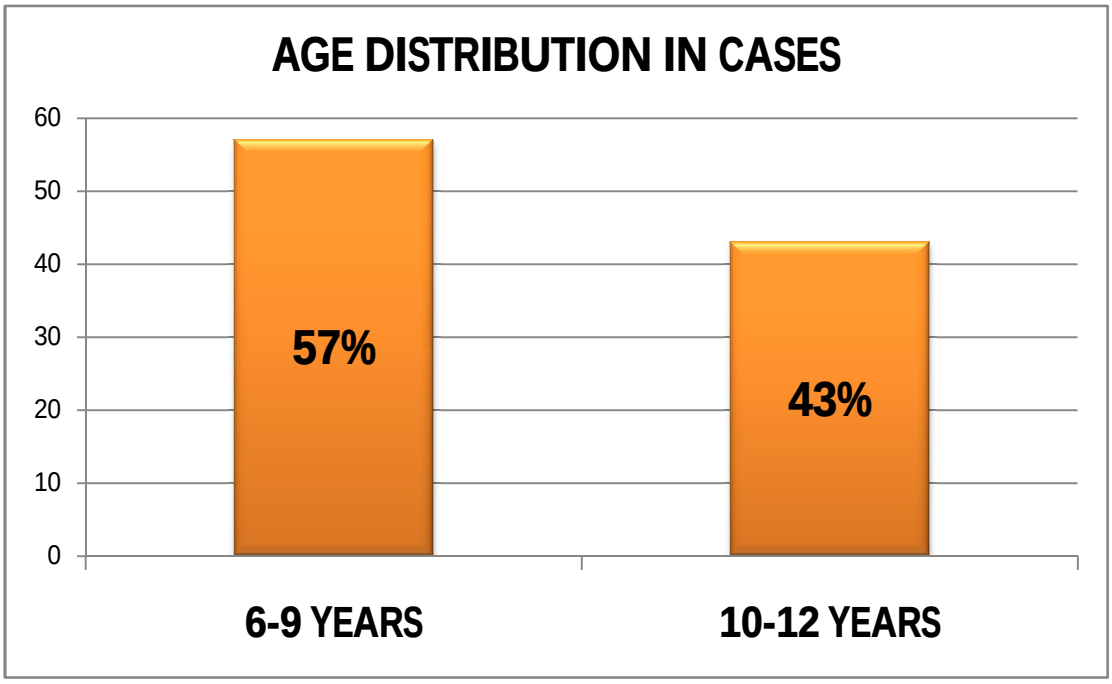
Description and homogeneity:

The children with seizures (cases) and normal children (control) were described according to their demographic profiles such as age and gender.

Table-1: Age wise distribution of cases & controls:

Age group (years)	CASES		CONTROLS	
	Frequencies	%	Frequencies	%
6-9	57	57.0	57	57.0
10-12	43	43.0	43	43.0
Total	100	100.0	100	100.0
Mean ±SD	9.2±1.7		9.2±1.7	

The table-1 shows the age wise distribution of cases & controls. The mean ages of both groups were 9.2±1.7 years.


AGE DISTRIBUTION IN CASES
60
50
40
30
20
10
0
57%
43%
6-9 YEARS
10-12 YEARS

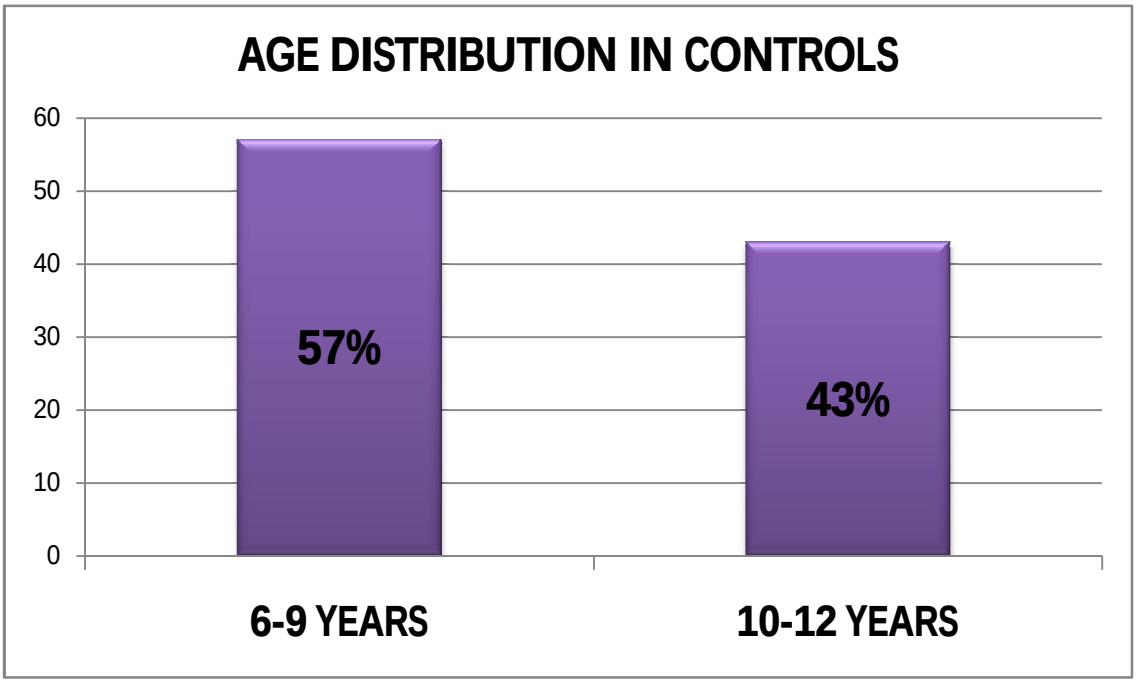
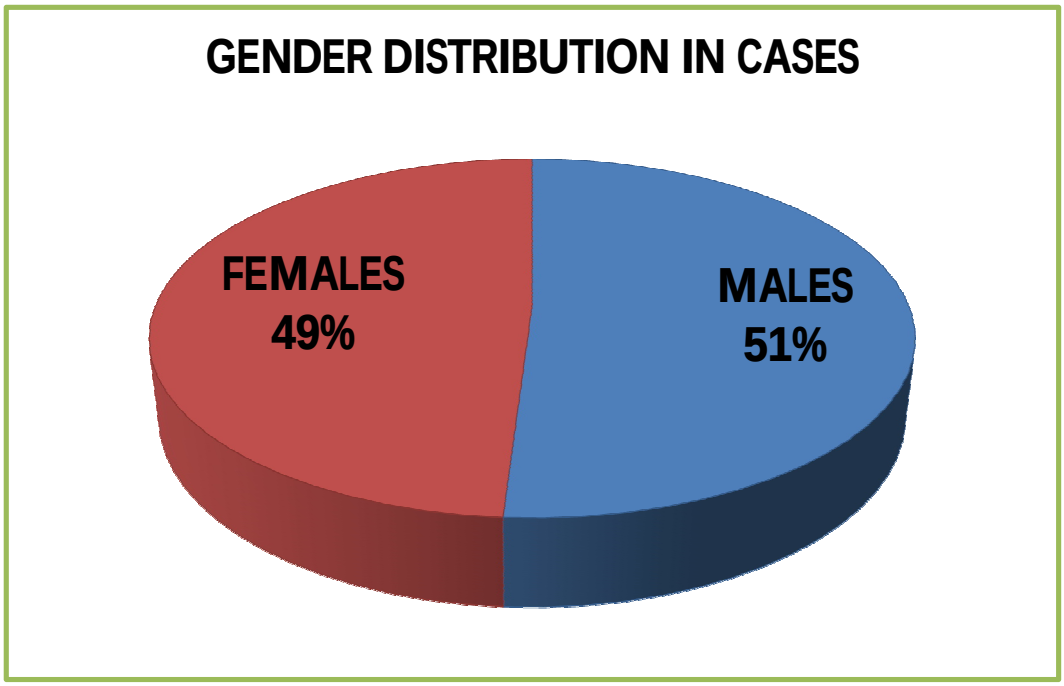

AGE DISTRIBUTION IN CONTROLS
60
50
40
30
20
10
0
57%
43%
6-9 YEARS
10-12 YEARS

Table-2: Gender wise distribution of cases & controls:

Gender	CASES		CONTROLS		Total	
	No	%	No	%	No	%
Males	51	51.0	51	51.0	102	51.0
Females	49	49.0	49	49.0	98	49.0
Total	100.0	100.0	100.0	100.0	200	100.0

The table-2 shows the Gender wise distribution of cases & controls. The male and females were 51% and 49% in both groups.


GENDER DISTRIBUTION IN CASES
FEMALES
49%
MALES
51%

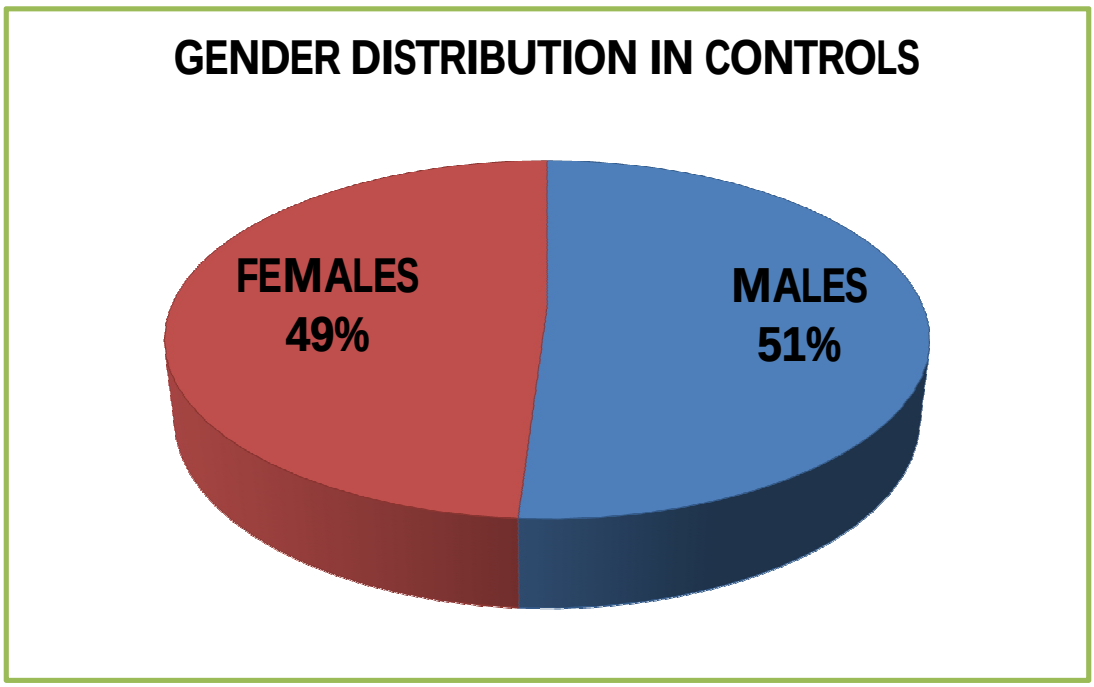
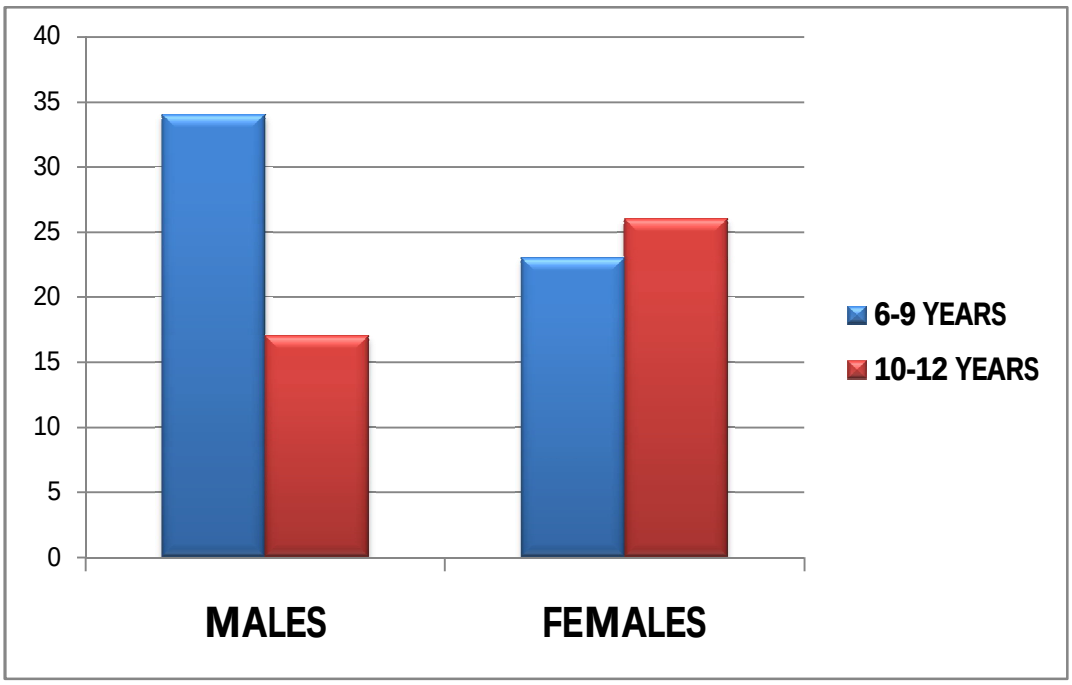

GENDER DISTRIBUTION IN CONTROLS
FEMALES
49%
MALES
51%

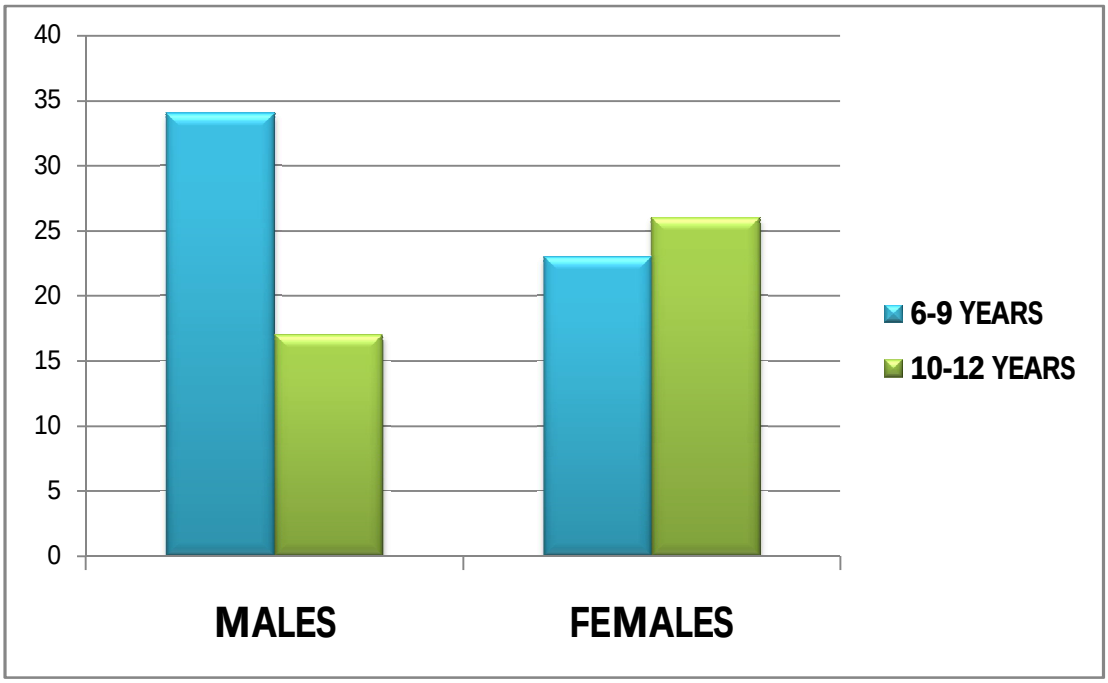
Table-3: Age and gender wise distribution of cases & controls:

Age group (years)	CASES				CONTROLS			
	Male		Female		Male		Female	
	No	%	No	%	No	%	No	%
6-9	34	66.7	23	46.9	34	66.7	23	46.9
10-12	17	33.3	26	53.1	17	33.3	17	53.1
Total	51	100.0	49	100.0	51	100.0	49	100.0
Mean ±SD	8.8±1.7		9.5±1.8		8.8±1.7		9.5±1.8	

The table-3 shows the age and gender wise distribution of cases & controls. The mean ages of males and females were 8.8±1.7 years and 9.5±1.8 years.



AGE & GENDER WISE DISTRIBUTION OF CASES



AGE & GENDER WISE DISTRIBUTION OF CONTROLS

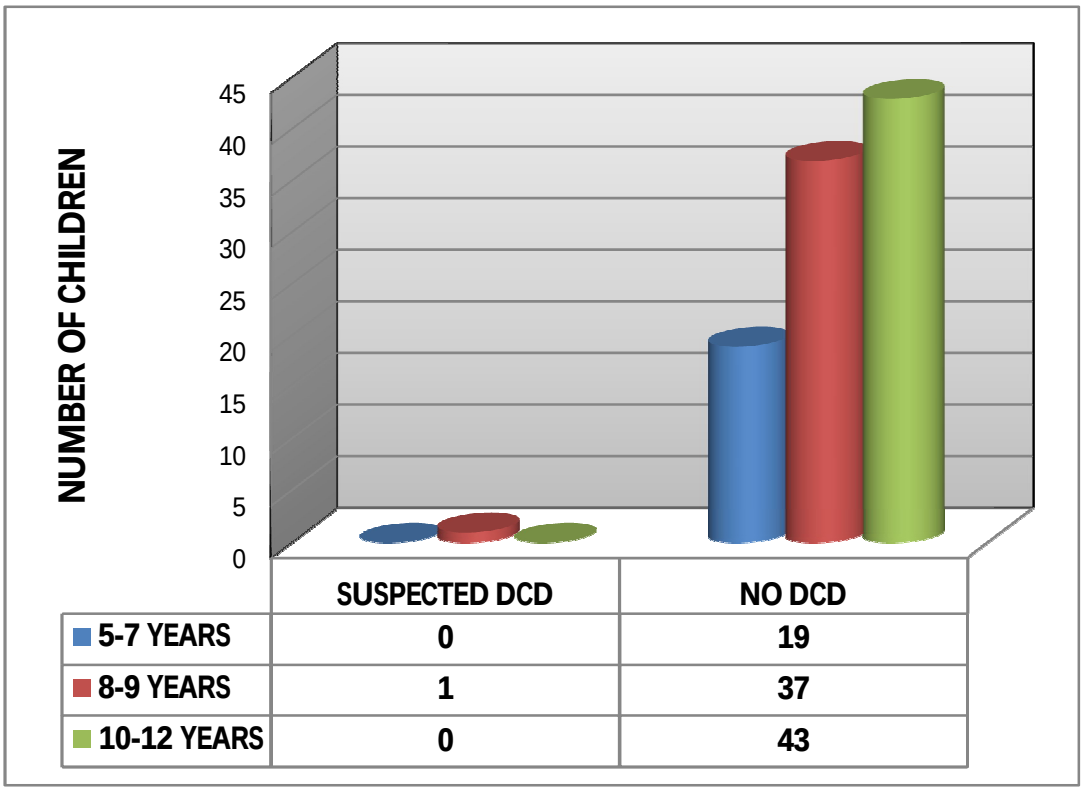
Comparison of results of questionnaires between cases and controls:

The two groups were administered the questionnaires mentioned in the study manoeuvre [Developmental Coordination Disorder Questionnaire (DCDQ), Quality of Life in Childhood Epilepsy (QOLCE), Child behaviour check list (CBCL) and strength and difficulty Questionnaire (SDQ).

Comparison of results of DCD Questionnaire between the two groups according to their ages:

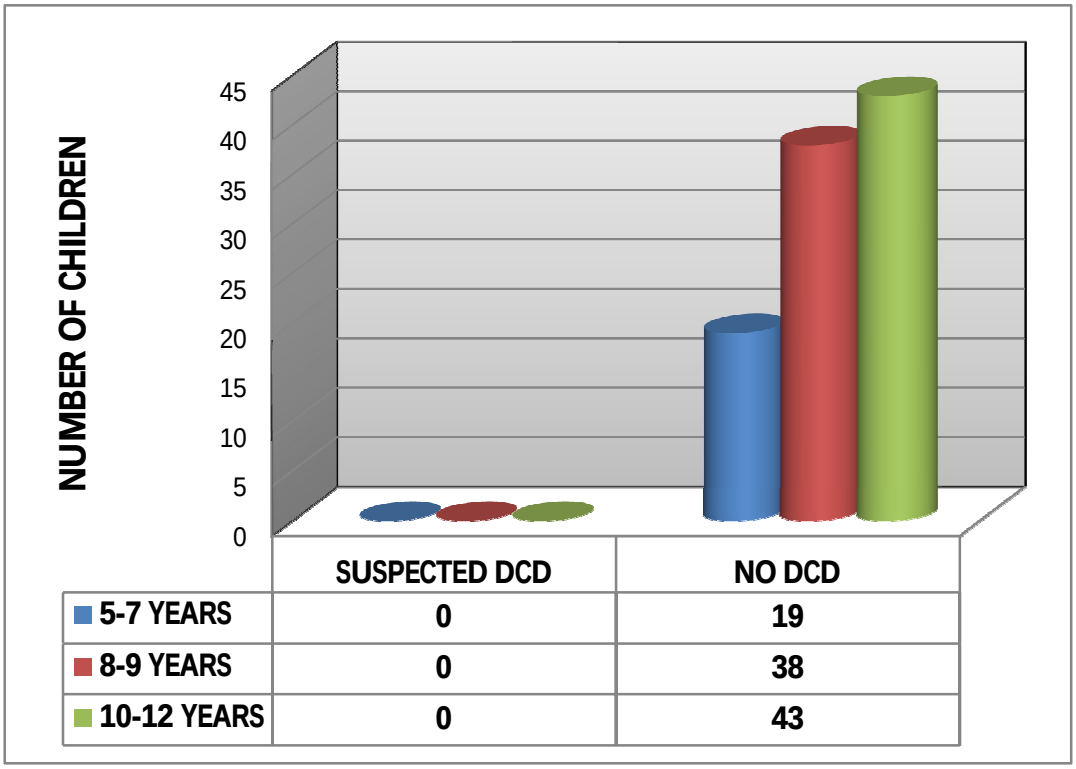
The following chart shows the scores of DCDQ between the two groups. The mean DCD score of seizure group was 72.9±4.9. The mean DCD score of control group was 74.8±1.2. The difference between the means was statistically very highly significant ($P<0.001$).

DEVELOPMENTAL COORDINATION DISORDER - CASES



	SUSPECTED DCD	NO DCD
5-7 YEARS	0	19
8-9 YEARS	1	37
10-12 YEARS	0	43

DEVELOPMENTAL COORDINATION DISORDER - CONTROLS



	SUSPECTED DCD	NO DCD
5-7 YEARS	0	19
8-9 YEARS	0	38
10-12 YEARS	0	43

Table-4: Comparison of results of Quality of Life in Childhood Epilepsy (QOLCE) questionnaire between the two groups:

Variable	Seizure group		Control group		Difference b/w means	"t"	df	Sig
	Mean	SD	Mean	SD				
QOLCE	55.4	30.7	84.3	13.5	28.9	8.620	198	P<0.001

The above table - 4 compares the scores of QOLCE questionnaire between the seizure and control groups. The mean QOLCE score of seizure group was 55.4±30.7 and the same of the control group was 84.3±13.5. The difference between the means of the two groups was statistically very highly significant (P<0.001).

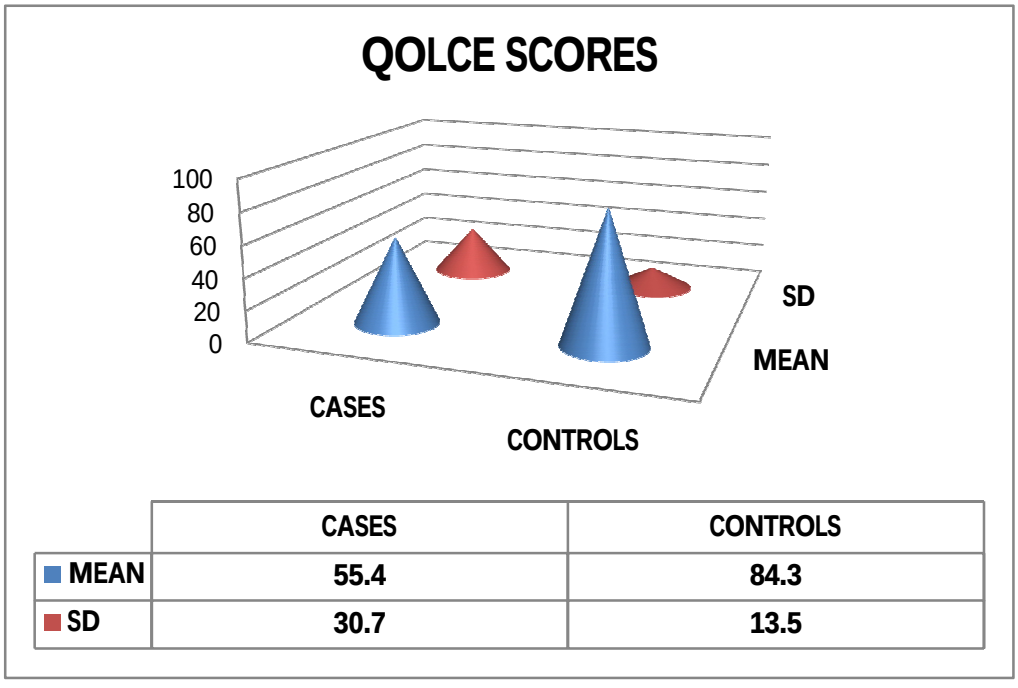


Table-5: Comparison of results of Child behaviour check list (CBCL) questionnaire between Seizure and control groups:

Variable	Seizure group		Control group		Difference b/w means	"t"	df	Sig
	Mean	SD	Mean	SD				
CBCL	38.6	40.6	5.4	20.6	33.2	7.297	198	P<0.001

The CBCL scores of seizure and control groups were compared in the above table-5. The mean CBCL score of seizure group was 38.6±40.6. The mean CBCL score of control group was 5.4±20.6. The difference of means between the two groups was statistically very highly significant (P<0.01).

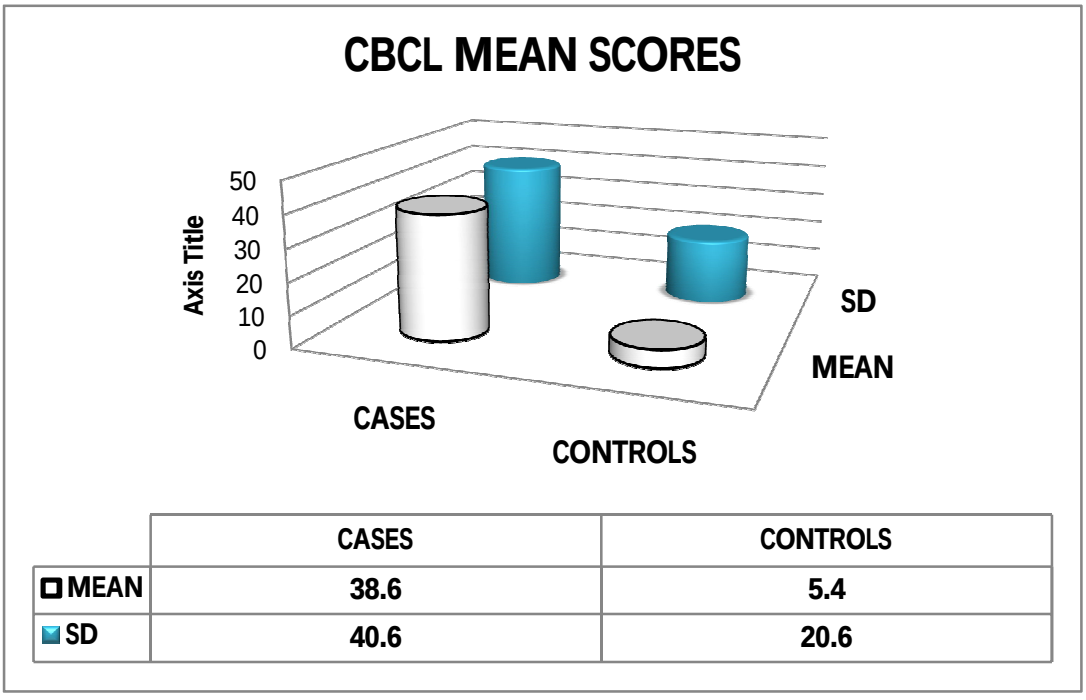


Table-6: Comparison of raw scores of CBCL questionnaire between the seizure and control groups in the age group of 6-11 years:

Groups	CBCL Score	Category	No	%	Z	Sig
Seizures	<38	Normal	44	50.6	7.072	P<0.001
	39-48	Border line	0	0.0		
	49+	Clinically. Significant	43	49.4		
	Total		87	100.0		
control	<38	Normal	81	93.1		
	39-48	Border line	0	0.0		
	49+	Clinically. Significant	6	6.9		
	Total		87	100.0		

Table-6 states the comparison between seizure and control groups in terms of raw CBCL scores (Age: 6-11 years). In the seizure group, 50.6% had CBCL scores <38 and 49.4% had scores >49. In the control group, 93.1% had CBCL scores <38 and 6.9% had scores >49. The differences between the two groups were statistically very highly significant (P<0.001).

Table-7: Comparison of raw scores of CBCL questionnaire between the seizure and control groups in the age group of 12-18 years:

Groups	CBCL Score	Category	No	%	Z	Sig
Seizures	<39	Normal	10	76.9	1.976	P<0.05
	40-51	Border line	0	0.0		
	52+	Clinically. Significant	3	23.1		
	Total		13	100.0		
Control	<39	Normal	13	100.0		
	40-51	Border line	0	0.0		
	52+	Clinically. Significant	0	0.0		
	Total		13	100.0		

Table-7 states the comparison between the seizure and control groups in terms of raw CBCL scores (Age: 12-18 years). In the seizure group, 76.9% had CBCL scores <39 and 23.1% had scores >52. In the control group, all children had CBCL scores <39 (100%). The differences between the two groups were statistically very highly significant (P<0.05).

Table-8: Comparison of results of Strength and Difficulty (SD) questionnaire with its components between Seizure and control groups:

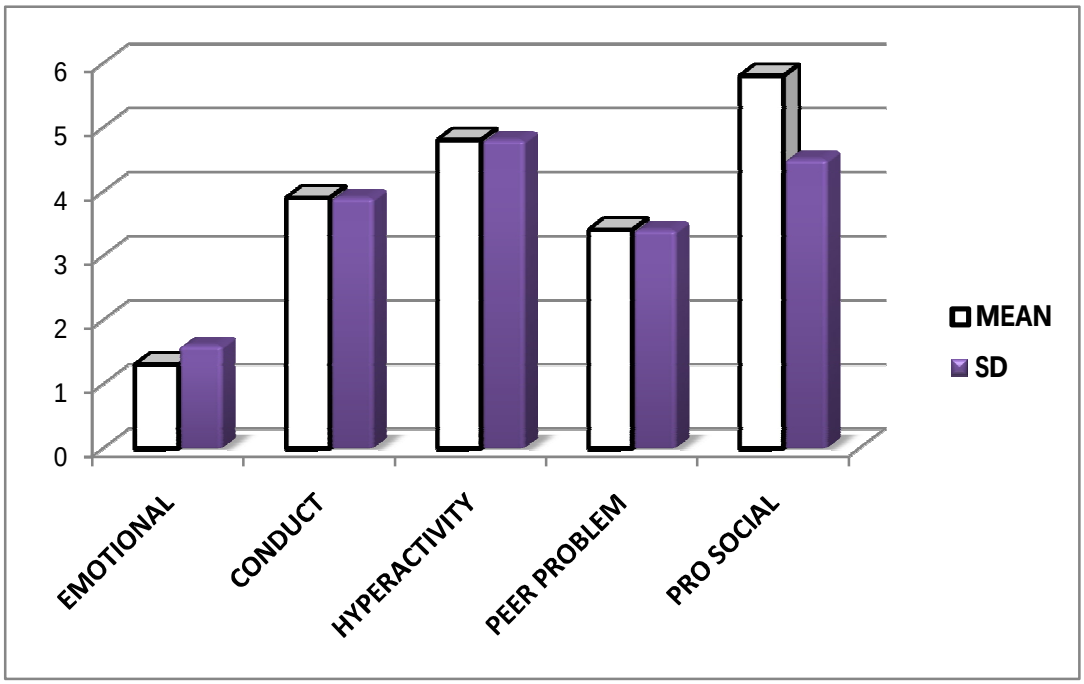
S&D Components	Seizure		Control		Difference b/w means	"t"	df	Sig
	Mean	SD	Mean	SD				
Emotional	1.3	1.6	0.2	0.9	1.1	5.609	198	P<0.001
Conduct	3.9	3.9	0.5	1.9	3.4	7.745	198	P<0.001
Hyper activity	4.8	4.8	0.6	2.2	4.2	8.088	198	P<0.001
Peer problem	3.4	3.4	0.6	1.6	2.8	7.548	198	P<0.001
Pro social	5.8	4.5	9.5	2.1	3.7	8.088	198	P<0.001
Externalizing Prob	8.7	8.6	1.1	4.1	7.6	7.977	198	P<0.001
Internalizing prob	4.7	4.7	0.8	2.4	3.9	7.400	198	P<0.001
Total S&D	13.4	13.2	1.9	6.4	11.5	7.842	198	P<0.001

The table-8 states the comparisons of scores of Strength & Difficulties questionnaire with its components between the cases & controls. The mean scores of the subscales are as follows (cases vs controls): emotional problems (1.3±1.6 vs 0.2±0.9), conduct problems (3.9±3.9 vs 0.5±1.9), hyperactivity' (4.8±4.8 vs 0.6±2.2), peer problem (3.4±3.4 vs 0.6±1.6), and pro-social (5.8±4.5 vs 9.5±2.1). The difference between the two groups in all subscales were statistically very highly significant (P<0.001).

The mean scores of the "externalising problems" subscale were 8.7±8.6 for cases and 1.1±4.1 for controls. The difference between the two groups was statistically very highly significant (P<0.001). Similarly, the

mean scores of the “internalising problems” subscale were 4.7±4.7 for the cases and 0.8±2.4 for the controls. The difference of means between the two groups was statistically very highly significant (P<0.001). The total mean score of the questionnaire was 13.4±13.2 for the seizure group and 1.9±6.4 for control group. The difference of means between the two groups was statistically very highly significant (P<0.001).

SDQ MEAN SCORES - CASES



SDQ MEAN SCORES- CONTROLS

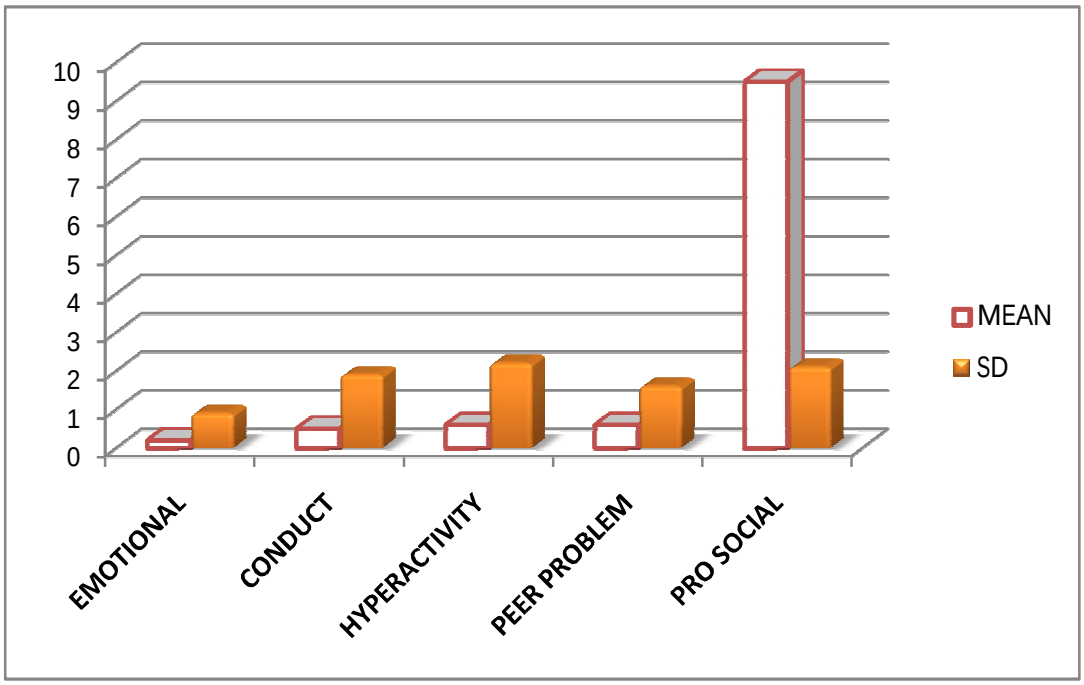
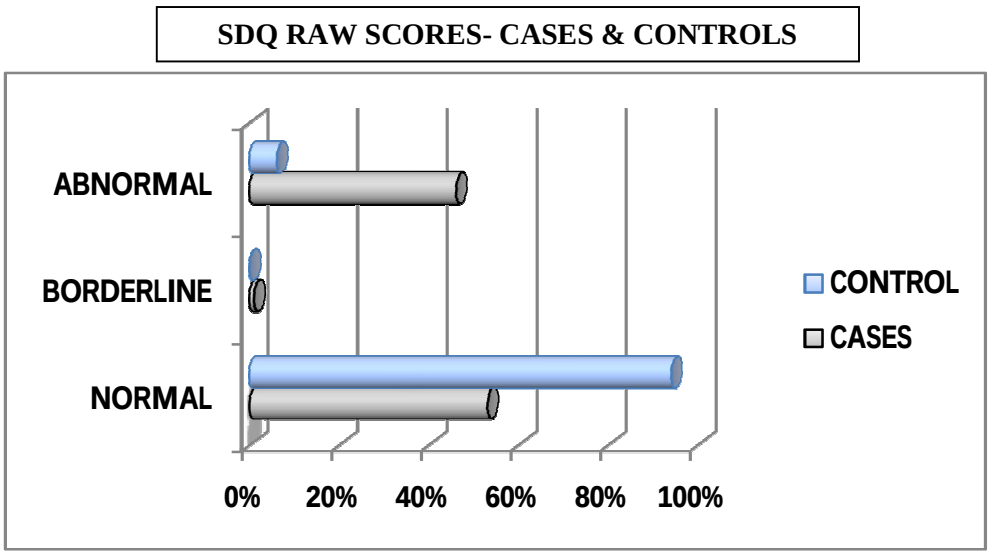


Table-9: Comparison of raw scores of SDQ between the Seizure group and control group:

SDQ score	Category	Seizures		control		"Z"	Sig
		No	%	No	%		
0-13	Normal	53	53.0	94	94.0	7.418	P<0.001
14-16	Border line	1	1.0	0	0.0		
17-40	Abnormal	46	46.0	6	6.0		
Total		100	100.0	50	100.0		

The above table-9 states the comparison between the raw scores of SDQ between the 2 groups. The raw scores of SDQ showed that 53% of cases had normal scores, 46% had abnormal scores and 1% had scores in the borderline, whereas in the control group 94% had normal scores and only 6% had abnormal scores.The differences between them were statistically very highly significant (P<0.001).



Epileptic children on monotherapy (single AED) vs polytherapy (multiple AEDs):

The monotherapy group was administered with single drug-valproate and the polytherapy group was administered with multiple drugs.

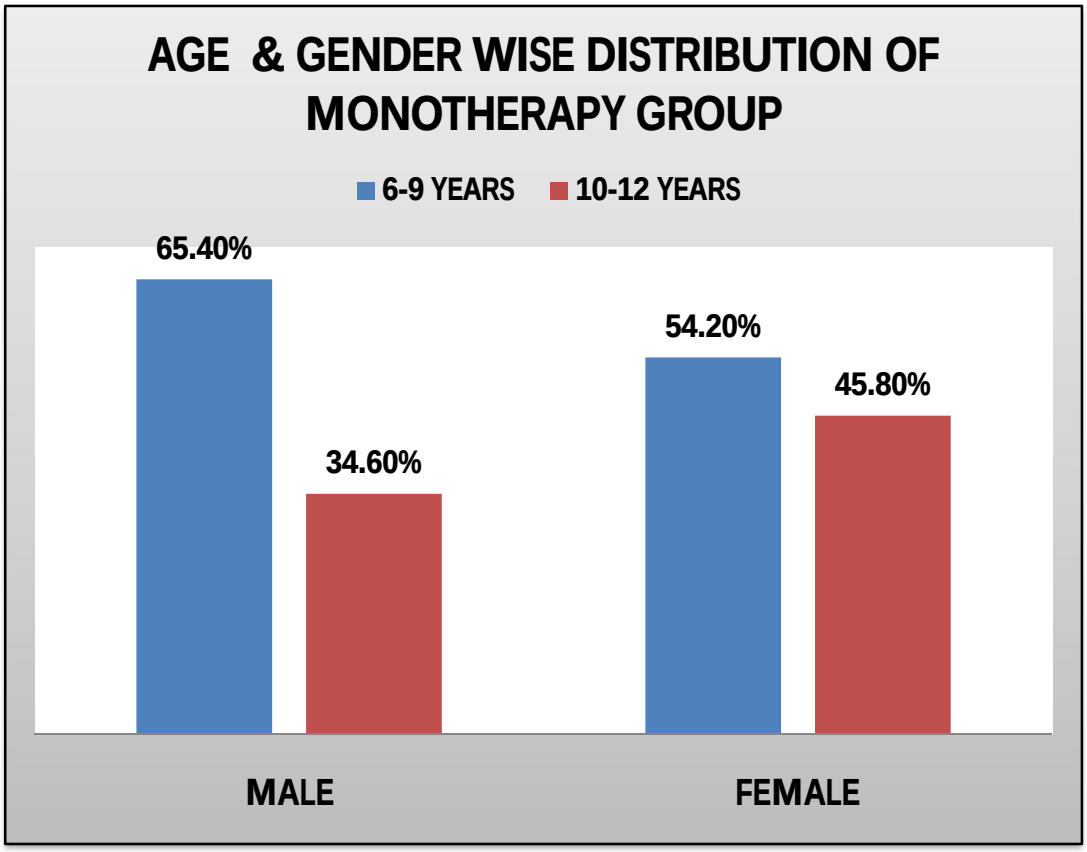
Table-10: Drugs administered to seizure groups:

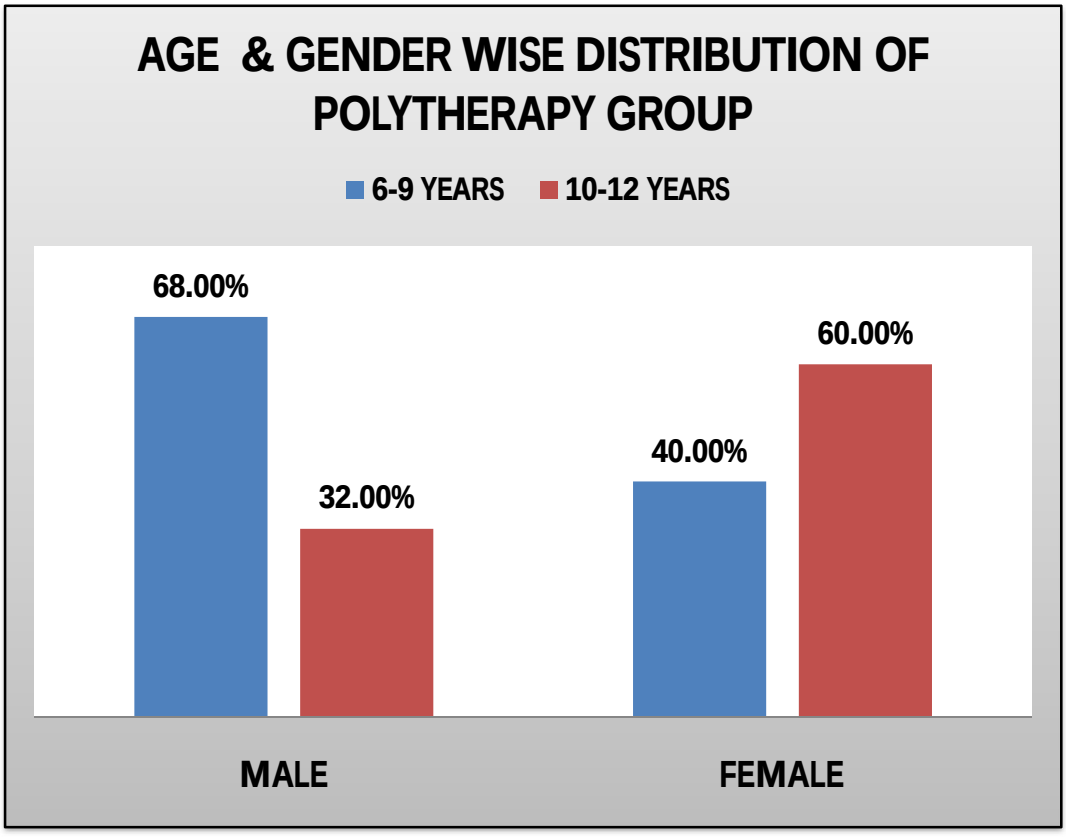
Name of the group	No of drugs	Name of the drugs
Monotherapy	Single	1.SVP 200 Mg
Polytherapy	Multiple	1.SVP 200 Mg
		2.LEVITIRACETAM 250MG
		3.PHENOBARBITONE
		4.PHENYTOIN 100MG
		5.CARBAMAZEPINE
		6.CLOBAZAM 5MG
		7.CLONAZEPAM
		8.LEVITIRACETAM 250MG
		9. OXCARBAZEPINE

Table-11: Age and gender wise distribution of Mono & polytherapy groups:

Age group (years)	Monotherapy group				Polytherapy group			
	Male		Female		Male		Female	
	No	%	No	%	No	%	No	%
6-9	17	65.4	13	54.2	17	68.0	10	40.0
10-12	9	34.6	11	45.8	8	32.0	15	60.0
Total	26	100.0	24	100.0	25	100.0	25	100.0
Mean ±SD	8.9±1.7		8.8±1.7		8.8±1.7		9.7±1.5	

The table-11 gives the gender wise age distribution between the Mono & polytherapy groups. The mean ages of males and females of Monotherapy group were 8.9±1.7 years and 8.8±1.7 years. The mean ages of polytherapy group were 8.8±1.7 years and 9.7±1.5 years.


AGE & GENDER WISE DISTRIBUTION OF MONOTHERAPY GROUP
6-9 YEARS
10-12 YEARS
65.40%
34.60%
54.20%
45.80%
MALE
FEMALE


AGE & GENDER WISE DISTRIBUTION OF POLYTHERAPY GROUP
6-9 YEARS
10-12 YEARS
68.00%
32.00%
40.00%
60.00%
MALE
FEMALE

Comparison of questionnaires between the Mono & polytherapy groups:

The questionnaires such as Developmental Coordination Disorder (DCD),

Quality of Life in Childhood Epilepsy (QOLCE), Child behaviour checks list (CBCL) and strength and difficulty (SD) were compared between the Mono & polytherapy groups.

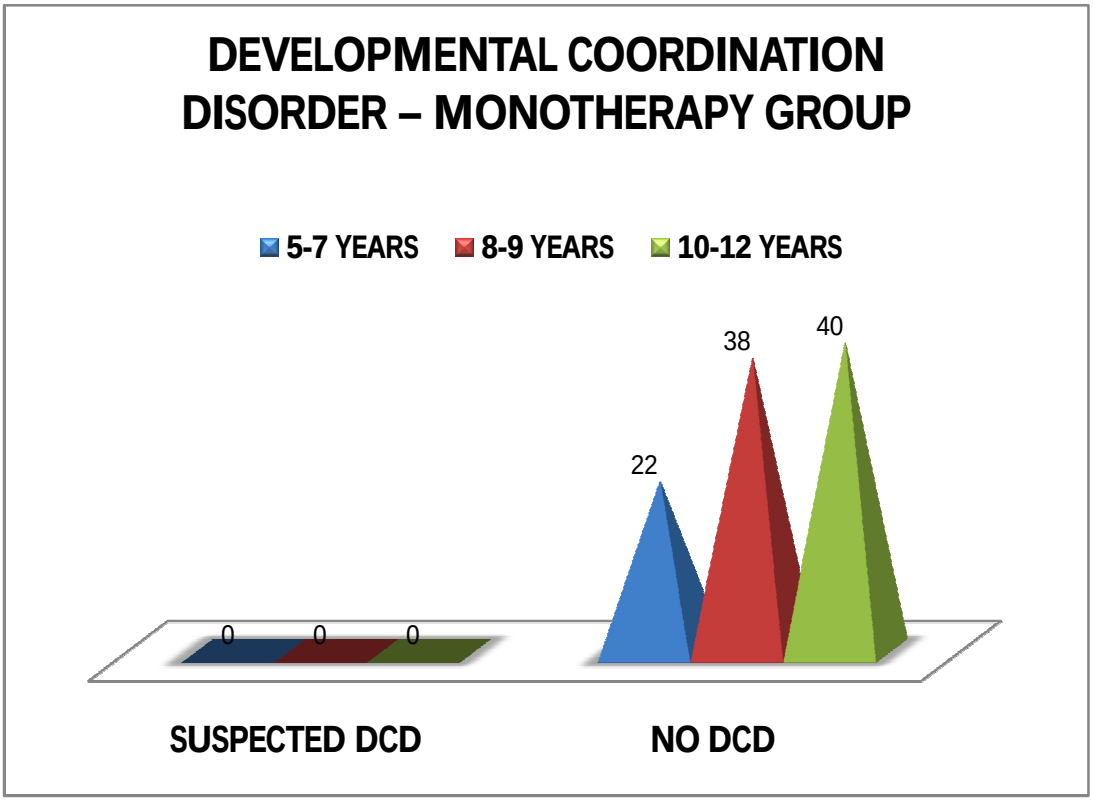
Table-12: Comparison of DCDQ between Mono & polytherapy groups according to the ages:

Age Years	Monotherapy group						Polytherapy group					
	Suspected DCD			No DCD			Suspected DCD			No DCD		
	Score	No	%	Score	No	%	Score	No	%	Score	No	%
5-7	15-46	0	0.0	47-75	11	22	15-46	0	0.0	47-75	8	19
8-9	15-55	0	0.0	56-75	19	38	15-55	1	2.0	56-75	18	38
10+	15-57	0	0.0	58-75	20	40	15-57	0	0.0	58-75	23	43
Total		0	0.0	-	50	100	-	1	2.0	-	49	98.0
Mean±SD		74.3±2.0					71.5±6.3					

"t" 2.945

Significance P<0.01

The table-12 compares the scores of DCDQ between the two groups. The mean DCD score of Monotherapy group was 74.3±2.0 and that of polytherapy group was 71.5±6.3. The difference between the means was statistically highly significant (P<0.01).


DEVELOPMENTAL COORDINATION DISORDER – MONOTHERAPY GROUP
5-7 YEARS
8-9 YEARS
10-12 YEARS
0
0
0
22
38
40
SUSPECTED DCD
NO DCD

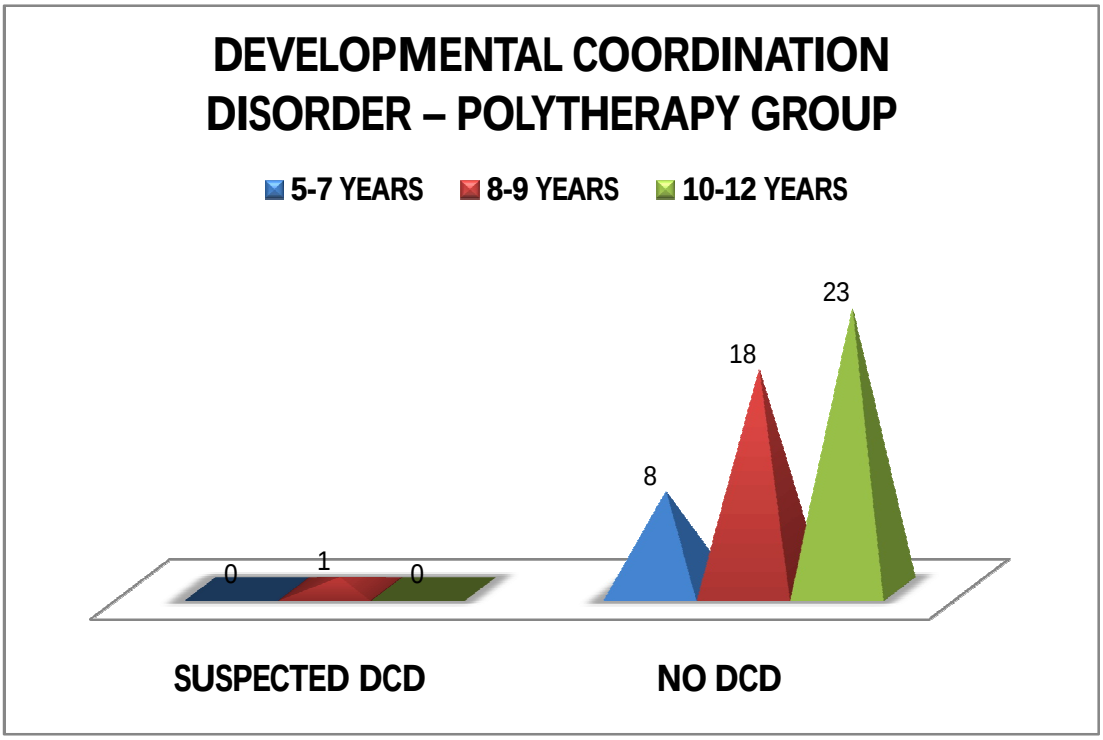

DEVELOPMENTAL COORDINATION DISORDER – POLYTHERAPY GROUP
5-7 YEARS
8-9 YEARS
10-12 YEARS
0
1
0
8
18
23
SUSPECTED DCD
NO DCD

Table-13: Comparison of results of Quality of Life in Childhood Epilepsy (QOLCE) questionnaire between Monotherapy & polytherapy group:

Variable	Monotherapy		Polytherapy		Difference b/w means	"t"	df	Sig
	Mean	SD	Mean	SD				
QOLCE	62.6	28.3	48.2	31.6	14.5	2.410	98	P=0.018

The above table -13 compares the scores of QOLCE questionnaire between the 2 groups. The mean QOLCE of Monotherapy group was 62.6±28.3 and that of the polytherapy group was 48.2±31.6. The difference between the means of the two groups was statistically significant (P<0.05).

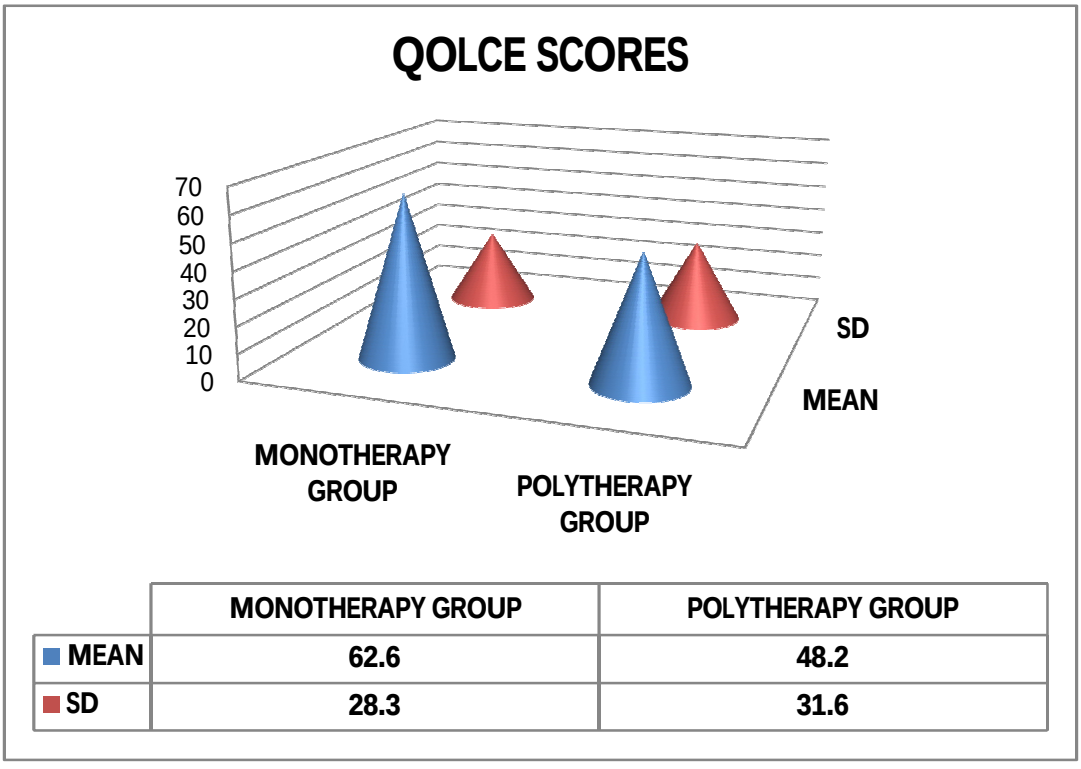


Table-14: Comparison of results of Child behaviour check list (CBCL) questionnaire between Monotherapy & polytherapy groups:

Variable	Monotherapy		Polytherapy		Difference b/w means	"t"	df	Sig
	Mean	SD	Mean	SD				
CBCL	29.5	37.9	47.6	41.6	18.1	2.277	98	P=0.025

The CBCL scores of 2 groups were compared in the above table-15. The mean CBCL score of Monotherapy group was 29.5±37.9 & that of the polytherapy group was 47.6±41.6. The difference of means between the two groups was statistically significant (P<0.025)

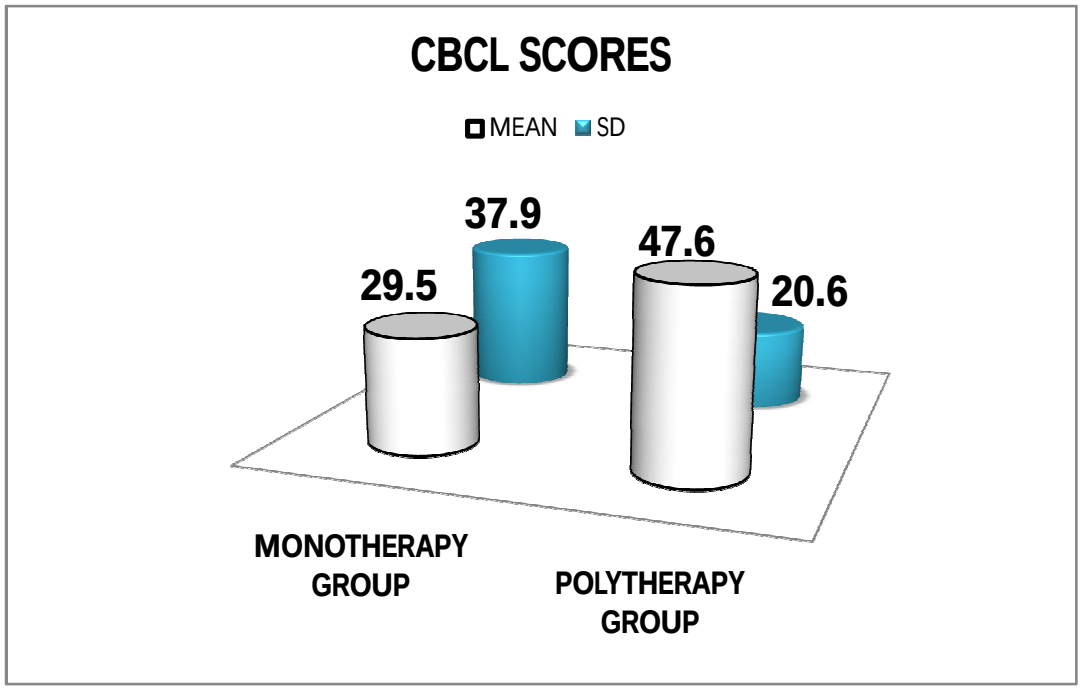


Table-15: Comparison of raw scores of CBCL questionnaire between the Mono & polytherapy groups in the age group of 6-11 years:

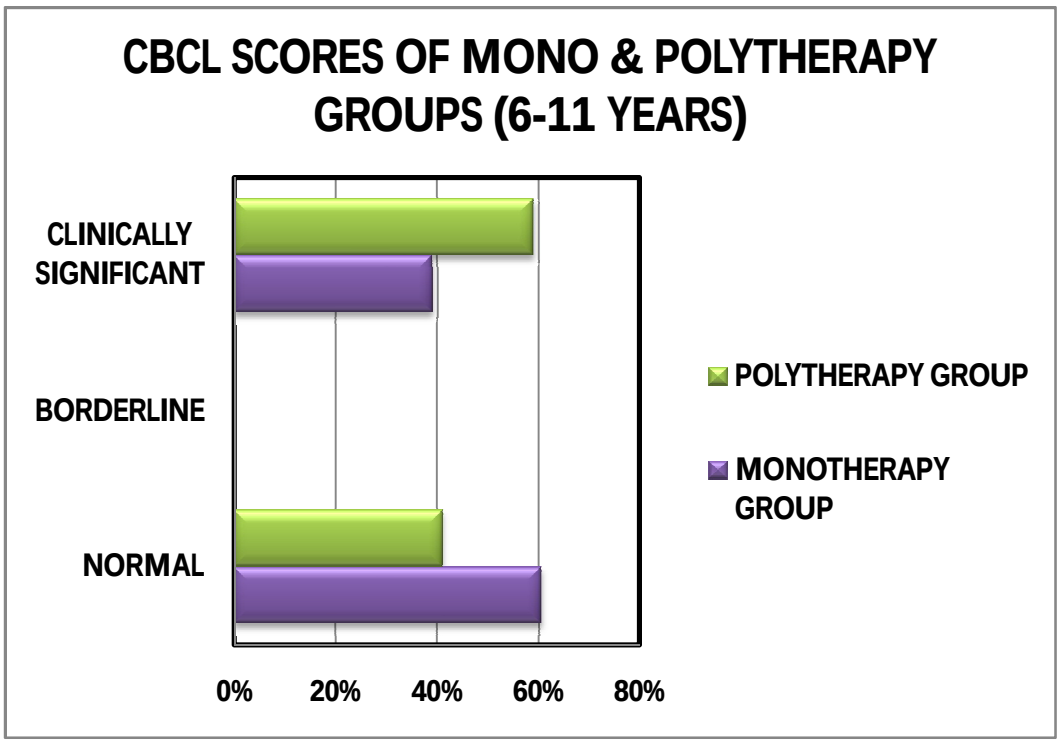
Groups	CBCL Score	Category	No	%	Z	Sig
Monotherapy	<38	Normal	26	60.5	2.159	P<0.05
	39-48	Border line	0	0.0		
	49+	Clinically. Significant	17	39.5		
	Total		43	100.0		
Polytherapy	<38	Normal	18	40.9		
	39-48	Border line	0	0.0		
	49+	Clinically. Significant	26	59.1		
	Total		44	100.0		

Table-15 states the comparison between the 2 groups. (Age: 6-11 years). In the monotherapy group, 60.5% had CBCL scores <38 and 39.5% had scores >49. In the polytherapy group, 40.9% had CBCL scores <38 and 59.1% had scores >49. The differences between the two groups were statistically significant (P<0.05).

Table-16: Comparison of raw scores of CBCL questionnaire between the Mono & polytherapy groups in the age group of 12-18 years:

Groups	CBCL Score	Category	No	%	Z	Sig
Monotherapy	<39	Normal	6	85.7	0.814	P>0.05
	40-51	Border line	0	0.0		
	52+	Clinically. Significant	1	14.3		
	Total		7	100.0		
Polytherapy	<39	Normal	4	66.7		
	40-51	Border line	0	0.0		
	52+	Clinically. Significant	2	33.3		
	Total		6	100.0		

Table-16 states the comparison between the 2 groups. (Age: 12-18 years). In the monotherapy group, 85.7% had CBCL scores <39 and 14.3% had scores >52. In the polytherapy group, 66.7% had CBCL scores <39 and 33.3% had scores >52. The differences between the two groups were statistically not significant (P>0.05).


CBCL SCORES OF MONO & POLYTHERAPY GROUPS (6-11 YEARS)
CLINICALLY SIGNIFICANT
BORDERLINE
NORMAL
0%
20%
40%
60%
80%
POLYTHERAPY GROUP
MONOTHERAPY GROUP

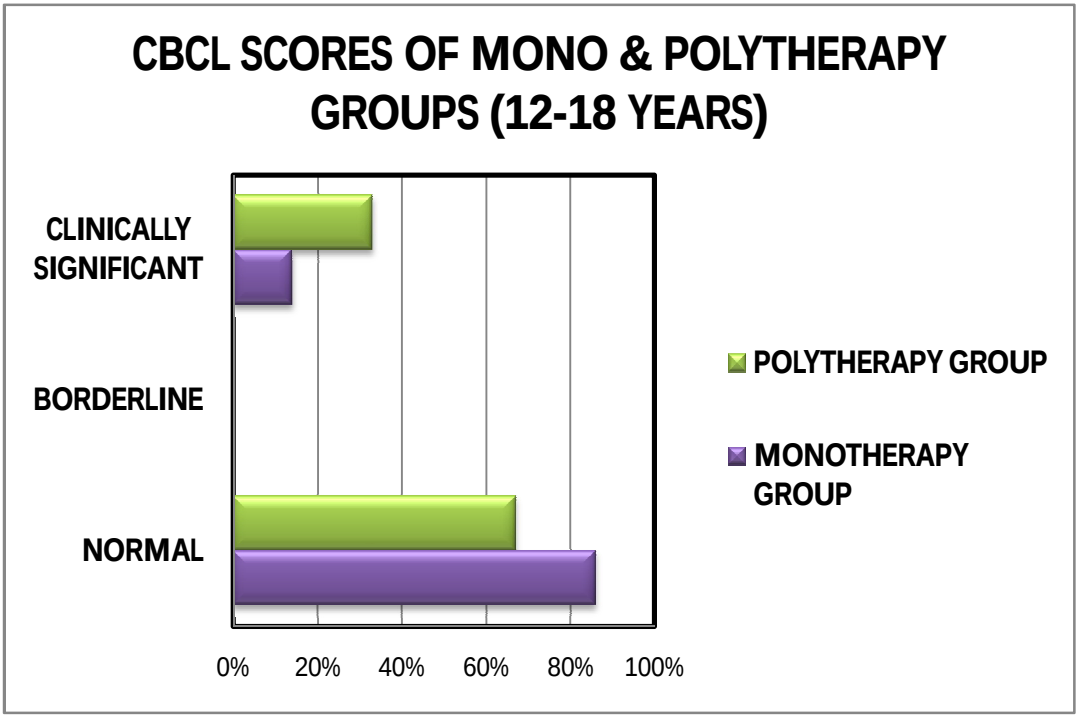
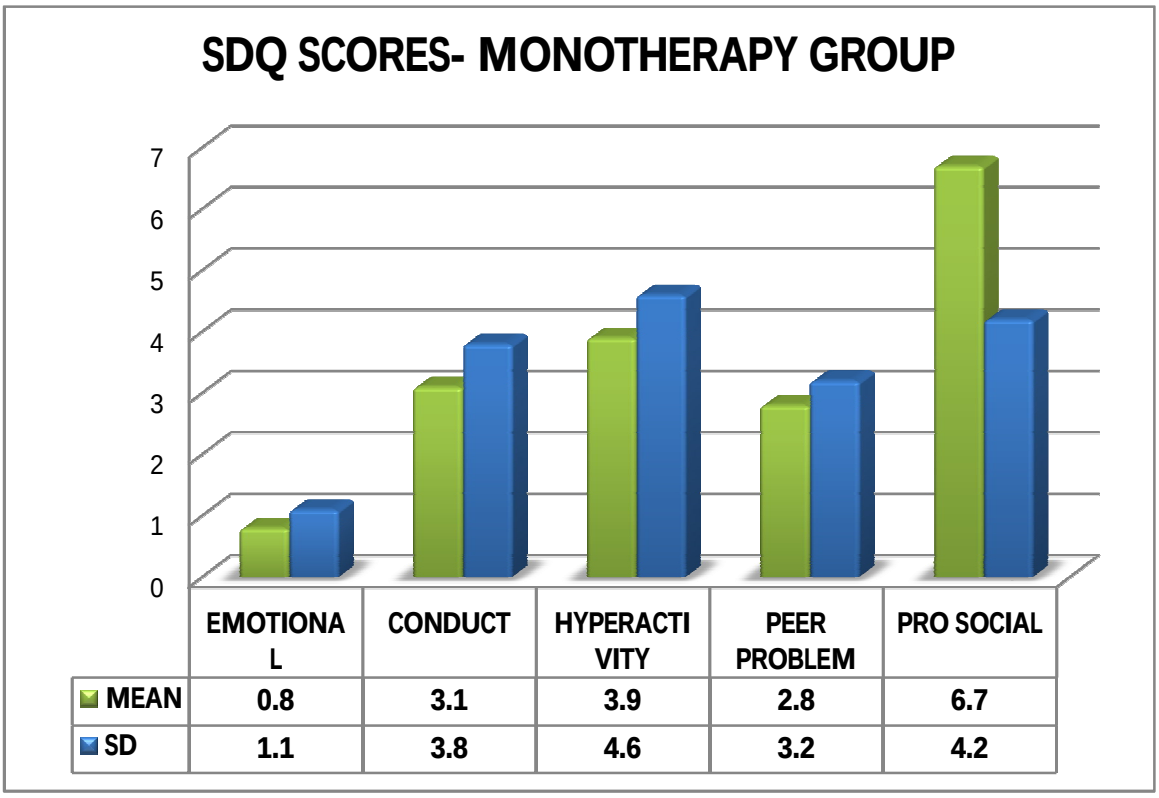

CBCL SCORES OF MONO & POLYTHERAPY GROUPS (12-18 YEARS)
CLINICALLY SIGNIFICANT
BORDERLINE
NORMAL
0%
20%
40%
60%
80%
100%
POLYTHERAPY GROUP
MONOTHERAPY GROUP

Table-17: Comparison of results of Strength and Difficulty (SD) questionnaire with its components between mono & polytherapy groups:

S&D Components	Monotherapy		Polytherapy		Difference b/w means	"t"	df	Sig
	Mean	SD	Mean	SD				
Emotional	0.8	1.1	1.7	1.8	0.9	3.009	98	P=0.003
Conduct	3.1	3.8	4.6	3.9	1.5	2.028	98	P=0.045
Hyper activity	3.9	4.6	5.8	4.8	1.9	2.004	98	P=0.048
Peer problem	2.8	3.2	4.1	3.6	1.3	1.944	98	P=0.055
Pro social	6.7	4.2	5.0	4.6	1.7	1.933	98	P=0.056
Externalizing Prob	7.0	8.4	10.4	8.6	3.4	2.024	98	P=0.046
Internalizing prob	3.6	4.2	5.8	4.9	2.2	2.438	98	P=0.017
Total S&D	10.5	12.5	16.2	13.4	5.7	2.183	98	P=0.013

The table-17 states the comparisons of SDQ components between the two groups (Mono and polytherapy). The mean scores of 'emotional problems' subscale of two groups were 0.8±1.1 and 1.7±1.8 respectively and the difference between them was statistically highly significant (P<0.01). The mean scores of 'conduct problems' subscales were 3.1±3.8 and 4.6±3.9. The difference between the two groups was statistically significant (P<0.05). The mean scores of 'hyperactivity' subscale were 3.9±4.6 and 5.8±4.8. The difference between the means was statistically significant (P<0.05). The mean scores of 'peer problem' subscale of monotherapy group was 2.8±3.2 and that of polytherapy group was 4.1±3.6. The difference between them was statistically not significant (P>0.05). The mean scores of 'pro social' subscale of monotherapy group was 6.7±4.2 and that of the polytherapy group was 5.0±4.6. The difference was

statistically not significant (P>0.05). The mean scores of “externalising problems” subscale (mono & polytherapy) were 7.0±8.4 and 10.4±8.6 respectively. The difference between the two groups was statistically significant (P<0.05). Similarly, the mean scores of “internalising problems” subscale were 3.6±4.2 and 5.8±4.9. The difference between the two groups was statistically significant (P<0.05). The total mean SDQ score of monotherapy group was 10.5±12.5 and that of polytherapy group was 16.2±13.4. The difference of means between the two groups was statistically significant (P<0.05).


SDQ SCORES- MONOTHERAPY GROUP
7
6
5
4
3
2
1
0
EMOTIONAL
CONDUCT
HYPERACTIVITY
PEER PROBLEM
PRO SOCIAL
MEAN 0.8 3.1 3.9 2.8 6.7
SD 1.1 3.8 4.6 3.2 4.2

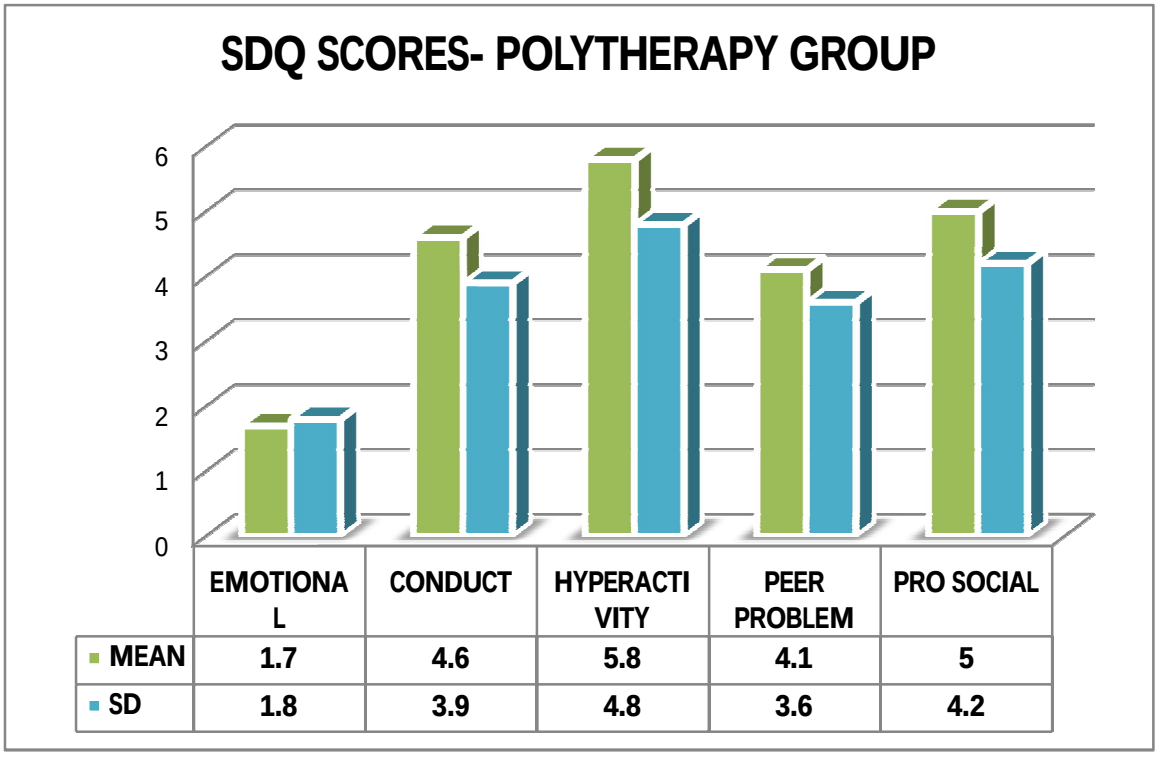

SDQ SCORES- POLYTHERAPY GROUP
6
5
4
3
2
1
0
EMOTIONAL
CONDUCT
HYPERACTIVITY
PEER PROBLEM
PRO SOCIAL
MEAN 1.7 4.6 5.8 4.1 5
SD 1.8 3.9 4.8 3.6 4.2

Table-18: Comparison of raw scores of SDQ between the Mono and polytherapy group:

SDQ score	Category	Monotherapy		Polytherapy		"Z"	Sig
		No	%	No	%		
0-13	Normal	31	62.0	22	44.0	1.833	P>0.05
14-16	Border line	1	2.0	0	0.0		
17-40	Abnormal	18	36.0	28	56.0		
Total		50	100.0	50	100.0		

The above table-18 states the comparison of raw scores of SDQ between the 2 groups. The raw scores of SDQ showed that 62% of monotherapy group had normal scores,36% had abnormal scores and 2% had scores in the borderline, whereas in the polytherapy group 44% had normal scores and 56% had abnormal scores.The differences between them were not statistically significant (P>0.05).

SDQ RAW SCORES- MONO AND POLYTHERAPY GROUP

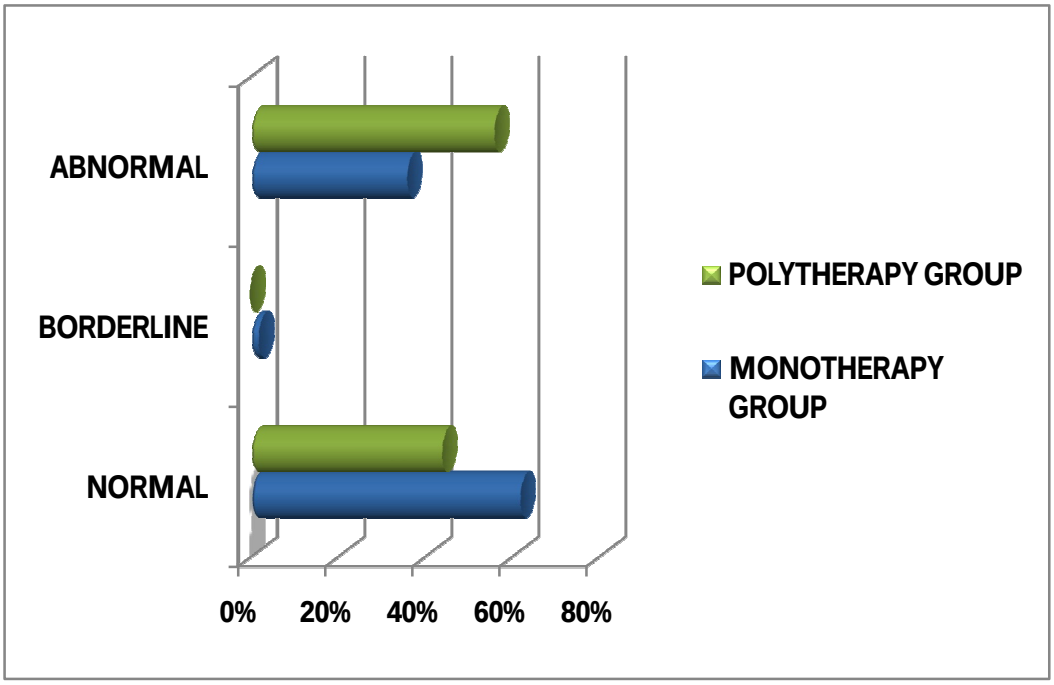


Table-19: Comparison of types of seizures between the groups' monotherapy and polytherapy:

Types of Seizure	MONOTHEARPY		POLYTHERAPY		Total		χ^2	df	Sig
	No	%	No	%	No	%			
Convulsive Status Epilepticus	8	16.0	24	48.0	32	32.0	21.783	2	P<0.001
GTCS	23	46.0	24	48.0	47	47.0			
Partial	19	38.0	2	4.0	21	21.0			
Total	50	100.0	50	100.0	100	100.0			

The above table-19 shows the type of seizures between the 2 groups. 16% had convulsive status epilepticus in the monotherapy group as against 48% in the polytherapy group. 46% in the monotherapy group had GTCS as against 48% in the polytherapy group.38% had partial seizures in the monotherapy group as against only 4% in the polytherapy group.

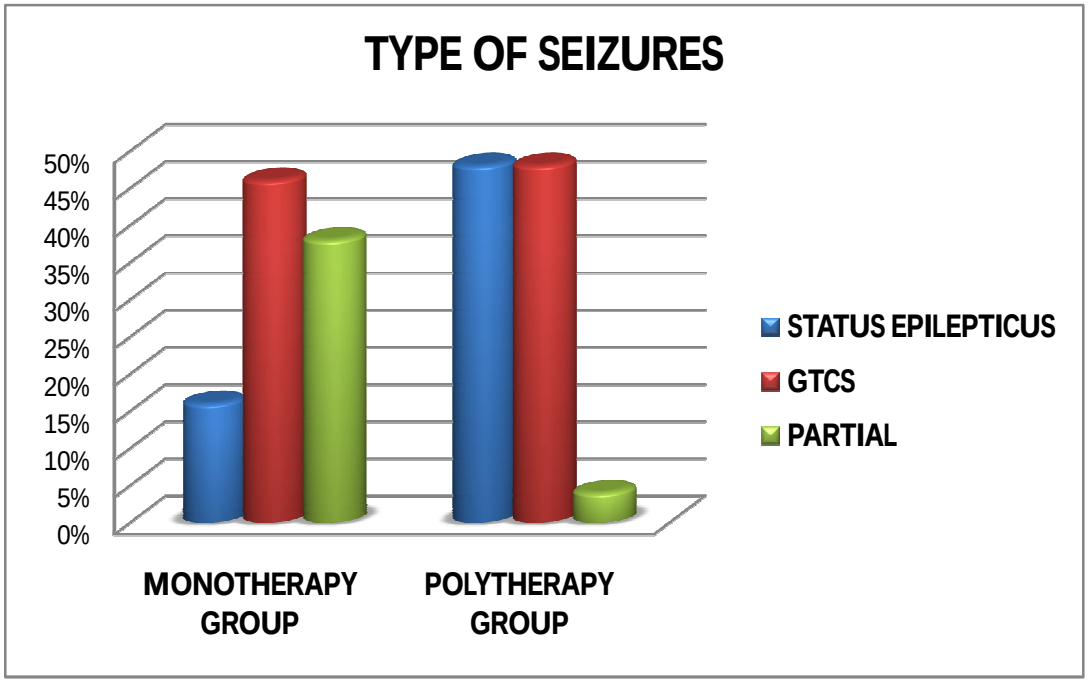


Table-20: Comparison of age at onset of seizure between the Mono and polytherapy groups:

Age (years)	Monotherapy		Polytherapy		Difference b/w means	"t"	df	Sig
	Mean	SD	Mean	SD				
Seizure on set	6.2	2.4	5.3	2.2	0.9	2.140	98	P=0.035

With respect to the age of onset of seizures, the mean age at onset was 6.2±2.4 years for monotherapy group and 5.3±2.2 years for polytherapy group. The difference of age between the two groups was statistically significant (P<0.05)

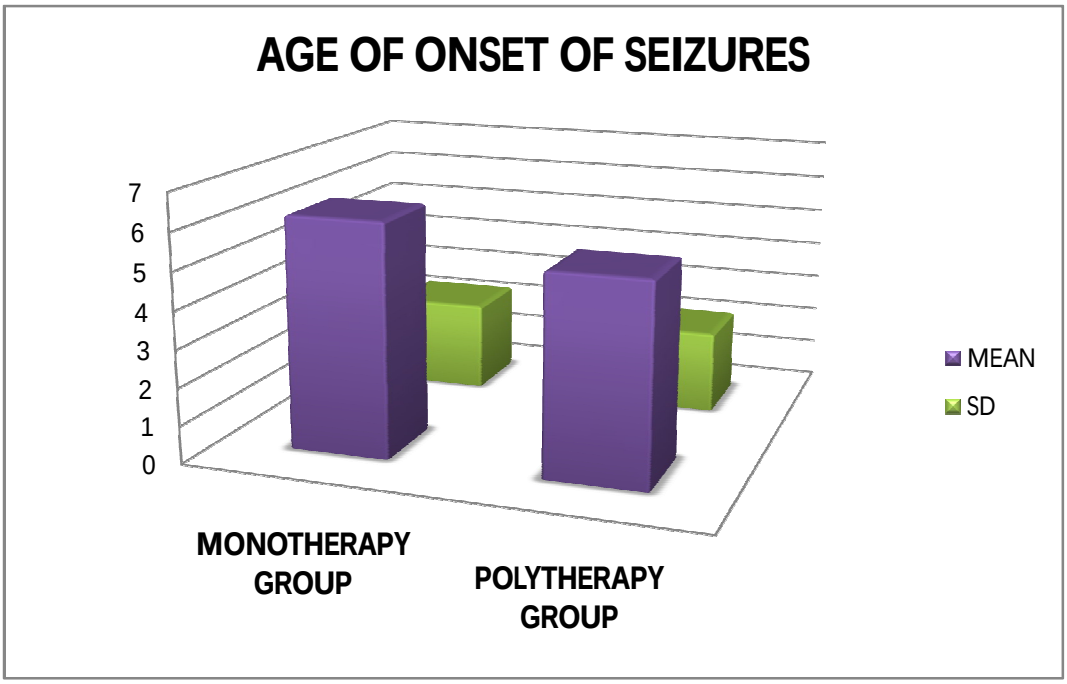


Table-21: Comparison of duration of seizures between the mono & polytherapy groups:

Duration (years)	Monotherapy		Polytherapy		Total		χ^2	df	Sig
	No	%	No	%	No	%			
0-1	3	6.0	11	22.0	14	14.0	5.851	2	P=0.054
1-2	18	36.0	18	36.0	36	36.0			
2+	29	58.0	21	42.0	50	50.0			
Total	50	100.0	50	100.0	100	100.0			

Comparison of mean duration of seizures showed that 6% children had seizures for 0-1 years in the monotherapy group as against 22% in the polytherapy group.36% children had seizures for 1-2 years in both the mono & polytherapy groups.58% children had seizures for more than 2 years in monotherapy group as against 42% in the polytherapy group

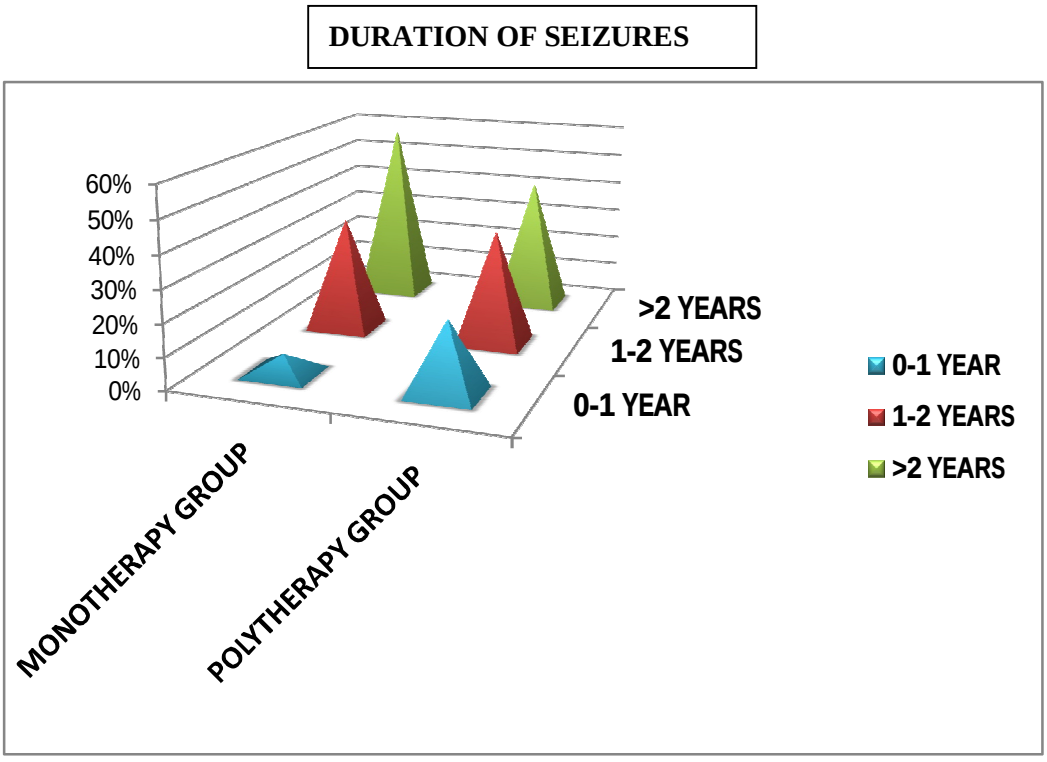


Table-22: Comparison of frequency of seizures between the mono & polytherapy groups:

Frequencies	Monotherapy		Polytherapy		Total		χ^2	df	Sig
	No	%	No	%	No	%			
Rarely	23	46.0	11	22.0	34	34.0	8.292	2	P=0.016
Monthly	6	12.0	15	30.0	21	21.0			
Yearly	21	42.0	24	48.0	45	50.0			
Total	50	100.0	50	100.0	100	100.0			

Comparison of seizure frequencies showed that 46% children in the monotherapy group had seizures occurring rarely as against 22% in the polytherapy group. 12% children had at least monthly 1 episode of seizure in the monotherapy group as against 30% in the polytherapy group. 42% children had at least 1 episode of seizure per year in the monotherapy group as against 48% in the polytherapy group. The differences between the 2 groups in seizure frequencies were statistically significant (P<0.05)

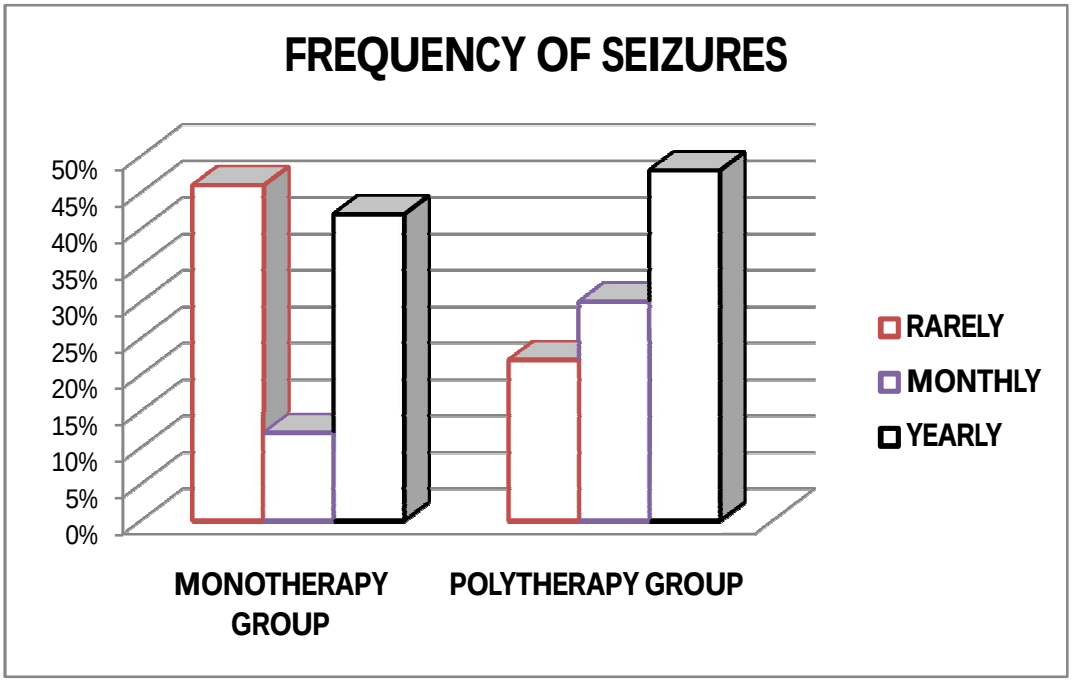


Table-23 Comparison of last episode of seizure between the mono & polytherapy groups:

Last Episodes (years)	Monotherapy		Polytherapy		Total		χ^2	df	Sig
	No	%	No	%	No	%			
0-1	11	22.0	21	42.0	32	32.0	7.323	2	P=0.026
1-2	19	38.0	20	40.0	39	39.0			
2+	20	40.0	09	18.0	29	18.0			
Total	50	100.0	50	100.0	100	100.0			

Comparison of last episode of seizure showed that 22% had seizures in the last 0-1 years in the monotherapy group as against 42% in the polytherapy group. 38% had seizures in the last 1-2 years in the monotherapy group as against 40% in the polytherapy group.40% children had seizures >2 years ago in the monotherapy group as against only 18% in the polytherapy group. The differences between the two groups in terms of last episode of seizures were statistically significant (P<0.05).

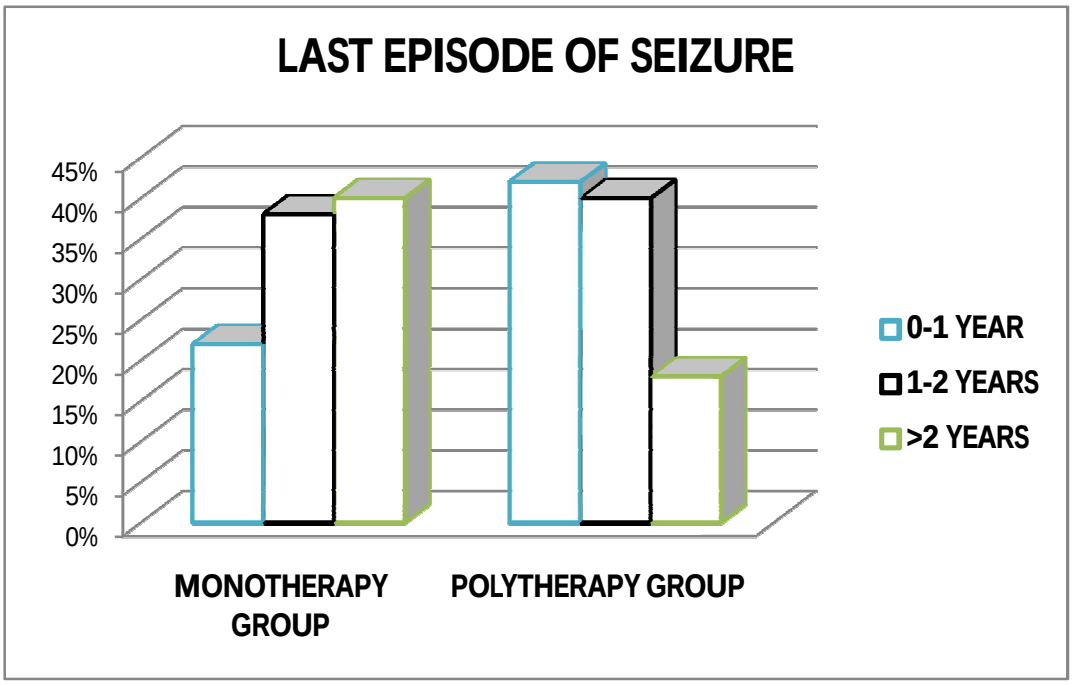
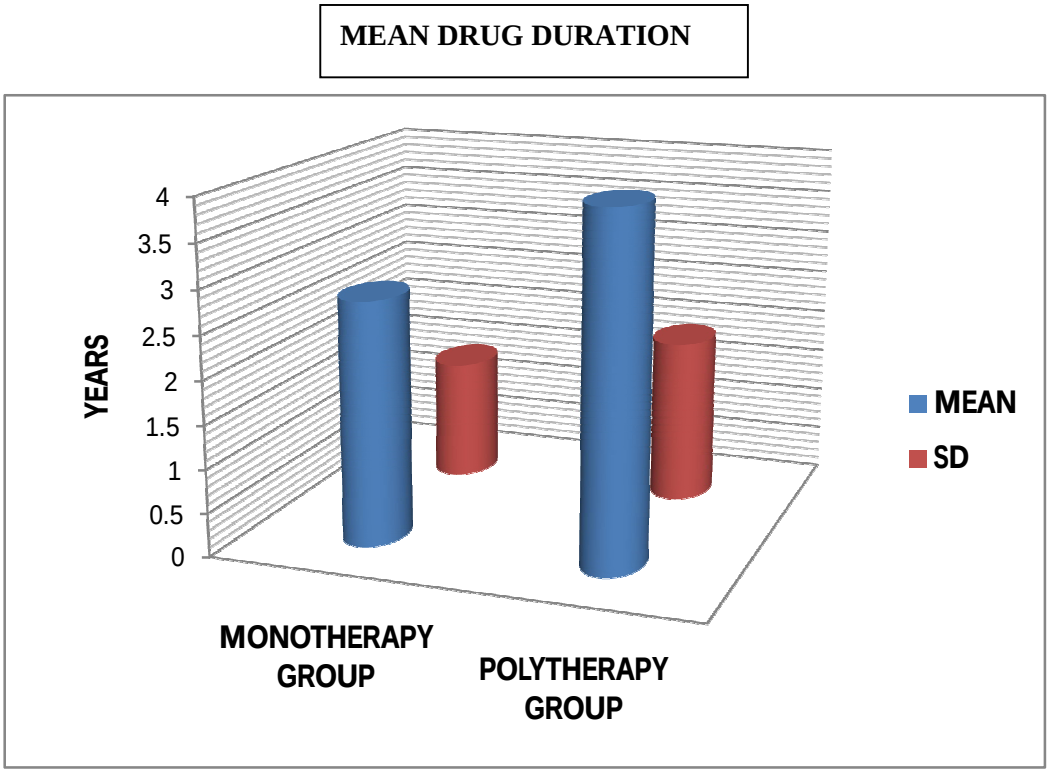


Table-24 Comparison of the duration of drug intake between the mono & polytherapy groups:

Drug (years)	Monotherapy		Polytherapy		Difference b/w means	"t"	df	Sig
	Mean	SD	Mean	SD				
Duration	2.8	1.4	4.0	1.9	1.2	3.463	98	P=0.001

Comparison of the duration of drug intake showed that the mean drug duration of monotherapy group was 2.8±1.4 years as against 4.0±41.9 in the polytherapy group. The difference of means between the two groups was statistically significant (P<0.01)



DISCUSSION

A total of 200 children in the age group of 6-12 years were included in the study (100 cases and 100 age and sex matched controls). Among the 100 cases, 50 were on single AED-valproate (Monotherapy group) and another 50 were on multiple AEDs (Polytherapy group). All children recruited into the study (fulfilling the inclusion criteria) were administered the following questionnaires: DCDQ, QOLCE, CBCL, and SDQ questionnaires and the scores of them were compared between the cases and controls and also between the mono & polytherapy groups. Additionally, the age of onset, the type of seizures, the frequency, duration, and age at last episode, and the mean drug duration was compared within the seizure groups.

Age distribution: Out of 100 cases, 57% were in the 6-9 years age group and 43% were in the 10-12% age group. Similarly, out of 100 controls, 57% were in the 6-9 years age group and 43% were in the 10-12% age group. The mean ages of both the groups were 9.2±1.7 years.

Gender distribution: Out of 100 cases, 51 % of the children were males and 49% were females. Similarly, out of 100 controls, 51 % were males and 49% were females.

Comparison of age and gender wise distribution between the cases and controls showed that the mean ages of males and females in both the groups were 8.8±1.7 years and 9.5±1.8 years.

The scores of DCD questionnaire showed that only 1 out of 100 cases fall in the 'suspected DCD group', and the remaining 99 fall in the 'No DCD group'. All controls fall in the 'No DCD group'.The mean DCD of seizure group was 72.9±4.9. The mean DCD of control group was 74.8±1.2. The difference between the means was statistically very highly significant (P<0.001), stating that the possibility of developmental coordination disorder is higher in the seizure group than the control group. In a study done by Stuart D.W.Smith et al, it was shown that the possibility of DCD was higher in children with Rolandic epilepsy than the controls [27].

The scores of QOLCE questionnaires showed that the mean QOLCE of seizure group was 55.4±30.7 and the same of the control group was 84.3±13.5. The difference between the means of the two groups was statistically very highly significant (P<0.001), stating that the quality of life is worse in seizure group (lower scores) than the control group as higher scores are associated with higher well-being. This result was similar to the study done by Nagesh adla et al in which the mean overall QOL score of 104 children aged 4-13 years was 46.82 ± 10.90 and hence concluded that children with epilepsy have a comparatively poorer quality of life. [24]

The scores of CBCL questionnaires showed that the mean CBCL of seizure group was 38.6±40.6. The mean CBCL of control group was 5.4±20.6. The difference of means between the two groups was statistically very highly significant (P<0.01).This result was similar to the study done by Om P Mishra et al in which the mean CBCL scores of cases were

significantly higher than controls [22]. In the age group of 6-11 years, it was found that 50.6% of children in the seizure group had normal CBCL scores, whereas 49.4% of children had abnormal scores (Scores >49 in 6-11 years group and >52 in 12-18 years group are considered abnormal). In the control group 93.1% of children had normal scores whereas only 6.9% had abnormal scores.The differences between the two groups were statistically very highly significant (P<0.05). In the age group of 12-18 years, 76.9% of children in the seizure group had normal CBCL scores, whereas 23.1% of children had abnormal scores. In the control group all children had normal scores (100%).The differences between the two groups were statistically significant (P<0.05).A similar result was also observed in a study done by Michael Freilinger et al in which 108 children with epilepsy aged 5 to 18 years were applied CBCL questionnaire and 22.2% had abnormal scores[25]. Hence our study shows that children in the seizure group have more clinically significant abnormal behavior (higher scores are associated with abnormal behavior) than the control group.

The analysis of results of SDQ questionnaire showed that the mean scores (cases vs controls) of emotional (1.3±1.6 vs 0.2±0.9), conduct (3.9±3.9 vs 0.5±1.9), hyperactivity (4.8±4.8 vs 0.6±2.2), and peer problem (3.4±3.4 vs 0.6±1.6) scales were higher in the seizure group than the control group (statistically very highly significant- P<0.001).On the other hand, the mean pro-social scores (5.8±4.5 vs 9.5±2.1) were higher in the control group, which was statistically very highly significant (P<0.001).The raw

scores of SDQ showed that 53% of cases had normal scores, 46% had abnormal scores and 1% had scores in the borderline, whereas in the control group 94% had normal scores and only 6% had abnormal scores.The differences between them were statistically very highly significant (P<0.001).Hence, our study shows that emotional problems, conduct problems, hyperactivity and peer problems are more common in the seizure group than the control population based on the SDQ scores. A similar result was published in the study done by Modage Anita et al [8].

The possibility of developmental coordination disorder, poorer quality of life, clinically significant abnormal behaviors, and emotional/ conduct/ hyperactivity/ peer problems are more common in the seizure group than the control group.

The seizure group was divided into 2 groups – Monotherapy group (single AED- valproate) and polytherapy group (multiple AEDs) and were compared.

Comparison of age and gender wise distribution between the 2 groups showed that the mean ages of males and females of monotherapy group were 8.9±1.7 years and 8.8±1.7 years respectively. The mean ages of males and females of polytherapy group were 8.8±1.7 years and 9.7±1.5 years respectively.

The scores of DCD questionnaire showed that only 1 out of 50 children in polytherapy group fall in the ‘suspected DCD’ group and the remaining 49 fall in the ‘No DCD’ group. All children in the monotherapy

group fall in ‘No DCD group’. The mean DCD of monotherapy group was 74.3±2.0. The mean DCD of polytherapy group was 71.5±6.3. The difference between the means was statistically highly significant (P<0.01), stating that the possibility of developmental coordination disorder is higher in the polytherapy group (lower scores are associated with DCD) than the monotherapy group.

The scores of QOLCE questionnaires showed that the mean QOLCE of monotherapy group was 62.6±28.3 and the same of the polytherapy group was 48.2±31.6. The difference between the means of the two groups was statistically significant (P<0.05), stating that the quality of life is worse in polytherapy group (lower scores) than the monotherapy group as higher scores are associated with higher well-being. This was similar to the results of the study done by JayashreeNadkarni et al in which poorer QOL was observed in children receiving polytherapy [26].

The scores of CBCL questionnaires showed that the mean CBCL of monotherapy group was 29.5±37.9. The mean CBCL of polytherapy group was 47.6±41.6. The difference of means between the two groups was statistically significant (P<0.5). In the age group of 6-11 years, it was found that 60.5% of children in the monotherapy group had normal CBCL scores, whereas 39.5% of children had abnormal scores. In the polytherapy group 40.9% of children had normal scores whereas 59.1% had abnormal scores.The differences between the two groups were statistically significant (P<0.05). In the age group of 12-18 years, 85.7% of children in the

monotherapy group had normal CBCL scores, whereas 14.3% of children had abnormal scores. In the polytherapy group 66.7% children had normal scores whereas 33.3% had abnormal scores.The differences between the two groups were not statistically significant (P>0.05). Hence, children in the polytherapy group have more clinically significant abnormal behavior (higher scores are associated with abnormal behavior) than the monotherapy group based on the CBCL scores. A similar result was also observed in the study done by Amir A. Sarhan et al [14].

The analysis of results of SDQ questionnaire showed that the mean scores (monotherapy group vs polytherapy group) of emotional (0.8±1.1 vs 1.7±1.8), conduct (3.1±3.8 and 4.6±3.9), hyperactivity (3.9±4.6 and 5.8±4.8), and peer problem (2.8±3.2 vs 4.1±3.6) scales were higher in the polytherapy group than the monotherapy group. The difference in scores of emotional (P<0.01), conduct(P<0.05), hyperactivity(P<0.05) scales between the 2 groups was statistically significant, whereas in the case of peer problem scale (P>0.05),it was not statistically significant. On the other hand, the mean pro-social scores (6.7±4.2 vs 5.0±4.6) were higher in the monotherapy group, which was not statistically significant (P>0.05).The raw scores of SDQ showed that 62% of monotherapy group had normal scores, 36% had abnormal scores and 2% had scores in the borderline, whereas in the polytherapy group 44% had normal scores and 56% had abnormal scores.The differences between them were not statistically significant (P>0.05). Hence, our study shows that emotional problems,

conduct problems, and hyperactivity problems are more common in the polytherapy group than the monotherapy group population based on the SDQ scores.Tanabe T[1]et al in their study observed a similar result [23]

Comparison of types of seizures between the mono & polytherapy groups showed that 16% had convulsive status epilepticus in the monotherapy group as against 48% in the polytherapy group. 46% in the monotherapy group had GTCS as against 48% in the polytherapy group.38% had partial seizures in the monotherapy group as against only 4% in the polytherapy group. Hence, our study shows that convulsive status epilepticus and GTCS were common in the polytherapy group whereas partial seizures were more common in the monotherapy.

Comparison of age at onset of seizure between the mono & polytherapy groups showed that the mean age at onset was 6.2±2.4 years for monotherapy group and 5.3±2.2 years for polytherapy group. The difference of age between the two groups was statistically significant ($P<0.05$), stating that the children in the polytherapy group had an early onset of seizures than the monotherapy group.

Comparison of mean duration of seizures showed that 6% children had seizures for 0-1 years in the monotherapy group as against 22% in the polytherapy group.36% children had seizures for 1-2 years in both the mono & polytherapy groups.58% children had seizures for more than 2 years in monotherapy group as against 42% in the polytherapy group

Comparison of seizure frequencies showed that 46% children in the monotherapy group had seizures occurring rarely as against 22% in the polytherapy group. 12% children had at least monthly 1 episode of seizure in the monotherapy group as against 30% in the polytherapy group. 42% children had at least 1 episode of seizure per year in the monotherapy group as against 48% in the polytherapy group. The differences between the 2 groups in seizure frequencies were statistically significant ($P<0.05$), stating that the children in the polytherapy group have more frequent seizures than the monotherapy group.

Comparison of last episode of seizure showed that 22% had seizures in the last 0-1 years in the monotherapy group as against 42% in the polytherapy group. 38% had seizures in the last 1-2 years in the monotherapy group as against 40% in the polytherapy group.40% children had seizures >2 years ago in the monotherapy group as against only 18% in the polytherapy group. The differences between the two groups in terms of last episode of seizures were statistically significant ($P<0.05$), again stating that the children in the polytherapy group had more frequent seizures than the monotherapy group.

Comparison of the duration of drug intake showed that the mean drug duration of monotherapy group was 2.8 ± 1.4 years as against 4.0 ± 41.9 in the polytherapy group. The difference of means between the two groups was statistically significant ($P<0.01$), stating that children in the polytherapy have been taking AEDs for longer duration than the monotherapy group.

The possibility of developmental coordination disorder, poorer quality of life, clinically significant abnormal behaviors, and emotional/ conduct/ hyperactivity problems are more common in the polytherapy group (multiple AEDs) than the monotherapy group (single AED). Also, Convulsive status epilepticus/GTCS, seizure profile-early onset/ longer duration/ increased frequency and longer duration of drug therapy are more common in the polytherapy group (multiple AEDs) than the monotherapy group (single AED).

Neurobehavioral comorbidities are common in children with seizure disorder than the general population. These were consistent with the results of the studies done by Charles J.Kind et al[9], Kari ModalsliAaberg et al[10], Ahyuda et al[16]. Furthermore, they are more common in children who are on multiple AEDs for longer duration with the seizures being CSE/GTCS type, earlier in age of onset, for longer duration and are frequently recurring. These were similar to the results of studies done by Amir A. Sarhan et al[14] and Om P Mishra et al[22].

CONCLUSION

- Neurobehavioral comorbidities are common in children with epilepsy than the general population.
- Children who are on multiple anti-epileptic drugs for longer duration are more vulnerable to these comorbidities than those on monotherapy.
- Early age of onset, increased frequency of seizures and increased duration of epilepsy are found to significantly affect the neurobehavioral outcome.
- Questionnaires like Strength & difficulties questionnaire (SDQ), Quality of life in childhood epilepsy questionnaire (QOLCE), Child behaviour checklist questionnaire (CBCL), and Developmental Coordination disorder questionnaire (DCDQ) can be used to screen these comorbidities.
- Based on their scores, children with epilepsy (Polytherapy> monotherapy) are at increased risk of developing behavioural and emotional problems, conduct and hyperactivity problems, developmental coordination disorder and hence have a poorer quality of life.
- These comorbidities may often affect the family life, friendships and classroom learning.
- When these are unattended, they may lead to school dropouts, irregularity and ultimately poor life outcomes.
- Therefore, screening of all children with epilepsy for cognitive & behavioural difficulties becomes mandatory and it should be incorporated in the management in childhood seizures.

STUDY LIMITATIONS

- The study did not take into account the family-related factors (family stress factors, family dynamics, and parent/child relationship) and personality traits that may have contributed to some degree of psychopathology in epileptic children.
- The effects of individual drugs on the neurobehavioral outcomes were not assessed separately.
- Questionnaires that are used in the study are only a screening test and hence further confirmation of the disorder/disease needs evaluation by a child psychiatrist.
- Separate IQ assessment was not done and it was indirectly assessed using the questionnaires.

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ANNEXURES

ABBREVIATIONS

- **AED** – Anti Epileptic Drug
- **DCDQ** – Developmental Coordination Disorder Questionnaire
- **QOLCE**- Quality Of Life in Childhood Epilepsy questionnaire
- **CBCL-**Child Behaviour Check List questionnaire
- **SDQ**-Strength and Difficulties Questionnaire
- **ADHD**-Attention Deficit Hyperactivity Disorder
- **ASD**-Autism Spectrum Disorder
- **ASQ**-Autism Screening Questionnaire
- **EEG**- Electroencephalography
- **ILAE**- International League of Association of Epilepsy
- **IEM**- Inborn Error of Metabolism
- **GERD**-Gastro Esophageal Reflux Disease
- **ICP**-Intra Cranial Pressure
- **GTCS**-Generalized Tonic Clonic Seizures
- **CSE**-Convulsive Status Epilepticus
- **LGS**- Lennox-Gastaut syndrome
- **CAE**-Childhood Absence Epilepsy
- **CPS**-Complex Partial Seizures
- **JME**-Juvenile Myoclonic Epilepsy
- **SVP**-Sodium Valproate
- **LEV**-Levetiracetam
- **CBZ**-Carbamazepine

DATA COLLECTION FORM

QUESTIONNAIRES

THE DEVELOPMENTAL COORDINATION DISORDER QUESTIONNAIRE 2007© (DCDQ'07)

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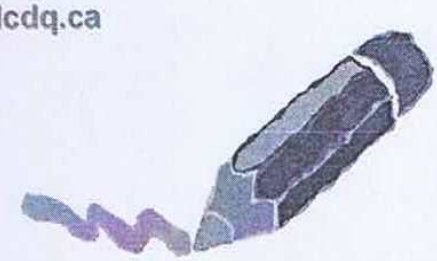

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Wilson, B.N., Crawford, S.G., Green, D., Roberts, G., Aylott, A., & Kaplan, B. (2009). Psychometric Properties of the Revised Developmental Coordination Disorder Questionnaire. *Physical & Occupational Therapy in Pediatrics, 29(2):182-202.*

COORDINATION QUESTIONNAIRE (REVISED 2007)

	Year	Mon	Day
Today's Date:			
Child's Birth:			
Child's Age:			

Name of Child: _____

Person completing Questionnaire: _____

Relationship to child: _____

Most of the motor skills that this questionnaire asks about are things that your child does with his or her hands, or when moving.

A child's coordination may improve each year as they grow and develop. For this reason, it will be easier for you to answer the questions if you think about other children that you know who *are the same age as your child*.

Please compare the degree of coordination your child has with other children of the same age when answering the questions.

Circle the one number that best describes your child. If you change your answer and want to circle another number, please circle the correct response twice.

If you are unclear about the meaning of a question, or about how you would answer a question to best describe your child, please call _____ at _____ for assistance.

	Not at all like your child 1	**A bit like your child** 2	**Moderately like your child** 3	**Quite a bit like your child** 4	**Extremely like your child** 5

1. Your child *throws a ball* in a controlled and accurate fashion.

   1 2 3 4 5

2. Your child *catches* a small *ball* (e.g., tennis ball size) thrown from a distance of 6 to 8 feet (1.8 to 2.4 meters).

   1 2 3 4 5

3. Your child *hits* an approaching *ball* or *birdie* with a bat or racquet accurately.

   1 2 3 4 5

4. Your child *jumps* easily *over* obstacles found in garden or play environment.

   1 2 3 4 5

5. Your child *runs* as fast and in a *similar* way to other children of the same gender and age.

   1 2 3 4 5

6. If your child has a *plan* to do a motor *activity*, he/she can organize his/her body to follow the plan and effectively complete the task (e.g., building a cardboard or cushion "fort," moving on playground equipment, building a house or a structure with blocks, or using craft materials).

   1 2 3 4 5 **(OVER)**

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	Not at all like your child 1	A bit like your child 2	Moderately like your child 3	Quite a bit like your child 4	Extremely like your child 5

7. Your child's printing or *writing* or drawing in class is *fast* enough to keep up with the rest of the children in the class.

1 2 3 4 5

8. Your child's printing or *writing* letters, numbers and words is *legible*, precise and accurate or, if your child is not yet printing, he or she *colors and draws* in a coordinated way and makes pictures that you can recognize.

1 2 3 4 5

9. Your child uses appropriate *effort* or tension when printing or writing or drawing (no excessive *pressure* or tightness of grasp on the pencil, writing is not too heavy or dark, or too light).

1 2 3 4 5

10. Your child *cuts* out pictures and *shapes* accurately and easily.

1 2 3 4 5

11. Your child is interested in and *likes* participating in *sports or active* games requiring good motor skills.

1 2 3 4 5

12. Your child learns *new motor tasks* (e.g., swimming, rollerblading) easily and does not require more practice or time than other children to achieve the same level of skill.

1 2 3 4 5

13. Your child is *quick and competent* in tidying up, putting on shoes, tying shoes, dressing, etc.

1 2 3 4 5

14. Your child would ***never*** be described as a *"bull in a china shop"* (that is, appears so clumsy that he or she might break fragile things in a small room).

1 2 3 4 5

15. Your child does ***not fatigue easily*** or appear to slouch and "fall out" of the chair if required to sit for long periods.

1 2 3 4 5

Thank you.

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COORDINATION QUESTIONNAIRE (DCDQ'07): SCORE SHEET

Name: _____ **Date:** _____

Birth Date: _____ **Age:** _____

	Control During Movement	Fine Motor/ Handwriting	General Coordination
1. Throws ball			
2. Catches ball			
3. Hits ball/birdie			
4. Jumps over			
5. Runs			
6. Plans activity			
7. Writing fast			
8. Writing legibly			
9. Effort and pressure			
10. Cuts			
11. Likes sports			
12. Learning new skills			
13. Quick and competent			
14. "Bull in shop"			
15. Does not fatigue			

TOTAL _____ / 30 (Control during Movement) + _____ / 20 (Fine Motor/ Handwriting) + _____ / 25 (General Coordination) = _____ / 75 **TOTAL**

For Children Ages 5 years 0 months to 7 years 11 months

15-46 indication of DCD or suspect DCD
47-75 probably not DCD

For Children Ages 8 years 0 months to 9 years 11 months

15-55 indication of DCD or suspect DCD
56-75 probably not DCD

For Children Ages 10 years 0 months to 15 years

15-57 indication of DCD or suspect DCD
58-75 probably not DCD

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Quality of Life in Childhood Epilepsy Questionnaire: QOLCE-55
Version 1.0 (English)

Goodwin SW, Lambrinos AI, Ferro MA, Sabaz M, Speechley KN. Development and assessment of a shortened Quality of Life in Childhood Epilepsy Questionnaire (QOLCE-55). Epilepsia 2015;56(6):864-72.

USER INFORMATION

Citation:

Individuals using the QOLCE-55 should cite the following reference in their work:

> Goodwin SW, Lambrinos AI, Ferro MA, Sabaz M, Speechley KN. Development and assessment of a shortened Quality of Life in Childhood Epilepsy Questionnaire (QOLCE-55). Epilepsia 2015;56(6):864-72.

QOLCE-55 Item Allocation:

1. Cognitive functioning (22 items): section 1.1 a-v.
2. Emotional functioning (17 items): section 2.1 a-k and section 2.2 a-f.
3. Social functioning (7 items): section 3.1 a-g.
4. Physical functioning (9 items): section 4.1 a-i.

Scoring Instructions:

1. Recode all items such that higher scores indicate higher well-being.
2. Convert the pre-coded numeric values of items to a 0-100 point scale, with higher converted scores always reflecting better quality of life. Responses should now be coded as 0, 25, 50, 75, 100.
3. Calculate the mean value of the items in each subscale. Adjust the denominator to include only items answered.
4. To calculate the total score, take the unweighted mean of the four subscales.

Quality of Life in Childhood Epilepsy Questionnaire: QOLCE-55
Version 1.0 (English)

Goodwin SW, Lambrinos AI, Ferro MA, Sabaz M, Speechley KN. Development and assessment of a shortened Quality of Life in Childhood Epilepsy Questionnaire (QOLCE-55). Epilepsia 2015;56(6):864-72.

INSTRUCTIONS

The following questions ask about your child's health and well-being. Answer the questions by ticking the appropriate box. Certain questions may look alike but each one is different. Some questions may ask about problems your child does not have. Please try to answer each question as it is important for us to know when your child does not have these problems. There are no right or wrong answers. If you are unsure how to answer a question, please give the best answer you can.

SECTION 1: YOUR CHILD'S COGNITIVE FUNCTIONING

The following questions ask about some problems children have with concentrating, remembering, and speaking.

1.1 Compared to other children of his/her own age, how often during the past 4 weeks has your child:

	Very Often	Fairly Often	Some-times	Almost Never	Never	Not Applicable
a. had difficulty attending to an activity?	☐	☐	☐	☐	☐	☐
b. had difficulty reasoning or solving problems?	☐	☐	☐	☐	☐	☐
c. had difficulty making plans or decisions?	☐	☐	☐	☐	☐	☐
d. had difficulty keeping track of conversations?	☐	☐	☐	☐	☐	☐
e. had trouble concentrating on a task?	☐	☐	☐	☐	☐	☐
f. had difficulty concentrating on reading?	☐	☐	☐	☐	☐	☐
g. had difficulty doing one thing at a time?	☐	☐	☐	☐	☐	☐
h. reacted slowly to things being said and done?	☐	☐	☐	☐	☐	☐
i. found it hard remembering things?	☐	☐	☐	☐	☐	☐
j. had trouble remembering names of people?	☐	☐	☐	☐	☐	☐
k. had trouble remembering where s/he put things?	☐	☐	☐	☐	☐	☐
l. had trouble remembering things people told him/her?	☐	☐	☐	☐	☐	☐
m. had trouble remembering things s/he read hours or days before?	☐	☐	☐	☐	☐	☐
n. planned to do something then forgot?	☐	☐	☐	☐	☐	☐

Below are statements that describe some children's behaviour.
Please try to answer all questions as well as you can, even if some do not seem to apply to your child.

2.2 Compared to other children his/her own age, how often during the past 4 weeks do each of the following statements describe your child?

	Very Often	Fairly Often	Some-times	Almost Never	Never	Not Applicable
a. was socially inappropriate (said or did something out of place in a social situation)	☐	☐	☐	☐	☐	☐
b. angered easily	☐	☐	☐	☐	☐	☐
c. hit or attacked people	☐	☐	☐	☐	☐	☐
d. swore in public	☐	☐	☐	☐	☐	☐
e. was obedient	☐	☐	☐	☐	☐	☐
f. demanded a lot of attention	☐	☐	☐	☐	☐	☐

SECTION 3: YOUR CHILD'S SOCIAL FUNCTIONING

Below are statements that describe some children's social interactions and activities.
Please try to answer all questions as well as you can, even if some do not seem to apply to your child.

3.1 During the past 4 weeks, how often has your child's epilepsy:

	Very Often	Fairly Often	Some-times	Almost Never	Never	Not Applicable
a. limited his/her social activities (visiting friends, close relatives, or neighbours)?	☐	☐	☐	☐	☐	☐
b. affected his/her social interactions at school or work?	☐	☐	☐	☐	☐	☐
c. limited his/her leisure activities (hobbies or interests)?	☐	☐	☐	☐	☐	☐
d. isolated him/her from others?	☐	☐	☐	☐	☐	☐
e. made it difficult for him/her to keep friends?	☐	☐	☐	☐	☐	☐
f. frightened other people?	☐	☐	☐	☐	☐	☐
g. During the past 4 weeks, how limited are your child's social activities compared with others his/her age because of his/her epilepsy or epilepsy-related problems?	☐ Yes, limited a lot	☐ Yes, limited some	☐ Yes, limited a little	☐ Yes, but rarely	☐ No, not limited	

	Very Often	Fairly Often	Some-times	Almost Never	Never	Not Applicable
o. had trouble finding the correct words?	☐	☐	☐	☐	☐	☐
p. had trouble understanding or following what others were saying?	☐	☐	☐	☐	☐	☐
q. had trouble understanding directions?	☐	☐	☐	☐	☐	☐
r. had difficulty following simple instructions?	☐	☐	☐	☐	☐	☐
s. had difficulty following complex instructions?	☐	☐	☐	☐	☐	☐
t. had trouble understanding what s/he read?	☐	☐	☐	☐	☐	☐
u. had trouble writing?	☐	☐	☐	☐	☐	☐
v. had trouble talking?	☐	☐	☐	☐	☐	☐

SECTION 2: YOUR CHILD'S EMOTIONAL FUNCTIONING

Below is a list that describes how your child might feel in general.

2.1 During the past 4 weeks, how much of the time do you think your child:

	All of the time	Most of the time	Some of the time	A little of the time	None of the time	Not Applicable
a. felt down or depressed?	☐	☐	☐	☐	☐	☐
b. felt happy?	☐	☐	☐	☐	☐	☐
c. wished s/he was dead?	☐	☐	☐	☐	☐	☐
d. felt frustrated?	☐	☐	☐	☐	☐	☐
e. worried a lot?	☐	☐	☐	☐	☐	☐
f. felt confident?	☐	☐	☐	☐	☐	☐
g. felt excited or interested in something?	☐	☐	☐	☐	☐	☐
h. felt pleased about achieving something?	☐	☐	☐	☐	☐	☐
i. felt nobody understood him/her?	☐	☐	☐	☐	☐	☐
j. felt valued?	☐	☐	☐	☐	☐	☐
k. felt no one cared?	☐	☐	☐	☐	☐	☐

SECTION 4: YOUR CHILD'S PHYSICAL FUNCTIONING

The following questions ask about physical activities your child might do.

4.1. In his/her daily activities during the past 4 weeks, how often has your child:

	Very Often	Fairly Often	Some-times	Almost Never	Never	Not Applicable
a. needed more supervision than other children his/her age?	☐	☐	☐	☐	☐	☐
b. played freely in the house like other children his/her age?	☐	☐	☐	☐	☐	☐
c. played freely outside the house like other children his/her age?	☐	☐	☐	☐	☐	☐
d. gone swimming (i.e., swam independently)?	☐	☐	☐	☐	☐	☐
e. participated in sports activities (other than swimming)?	☐	☐	☐	☐	☐	☐
f. stayed out overnight (with friends or family)?	☐	☐	☐	☐	☐	☐
g. played with friends away from you or your home?	☐	☐	☐	☐	☐	☐
h. gone to parties without you or without supervision?	☐	☐	☐	☐	☐	☐
i. been able to do the physical activities other children his/her age do?	☐	☐	☐	☐	☐	☐

Please print

CHILD BEHAVIOR CHECKLIST FOR AGES 6-18

For office use only ID #

CHILD'S FULL NAME First Middle Last

CHILD'S GENDER ☐ Boy ☐ Girl

CHILD'S AGE

CHILD'S ETHNIC GROUP OR RACE

TODAY'S DATE Mo. ____ Day ____ Year ____

CHILD'S BIRTHDATE Mo. ____ Day ____ Year ____

GRADE IN SCHOOL _____

NOT ATTENDING SCHOOL ☐

Please fill out this form to reflect *your* view of the child's behavior even if other people might not agree. Feel free to print additional comments beside each item and in the space provided on page 2. ***Be sure to answer all items.***

PARENTS' USUAL TYPE OF WORK, even if not working now.
(Please be specific — for example, auto mechanic, high school teacher, homemaker, laborer, lathe operator, shoe salesman, army sergeant.)
PARENT 1 (or FATHER)
TYPE OF WORK _____
PARENT 2 (or MOTHER)
TYPE OF WORK _____

THIS FORM FILLED OUT BY: (print your full name)
_____

Your gender: ☐ Male ☐ Female

Your relation to the child:
☐ Biological Parent ☐ Step Parent ☐ Grandparent
☐ Adoptive Parent ☐ Foster Parent ☐ Other (specify)

I. Please list the sports your child most likes to take part in. For example: swimming, baseball, skating, skate boarding, bike riding, fishing, etc.

☐ None

	Compared to others of the same age, about how much time does he/she spend in each?				Compared to others of the same age, how well does he/she do each one?			
	Less Than Average	Average	More Than Average	Don't Know	Below Average	Average	Above Average	Don't Know
a. _____	☐	☐	☐	☐	☐	☐	☐	☐
b. _____	☐	☐	☐	☐	☐	☐	☐	☐
c. _____	☐	☐	☐	☐	☐	☐	☐	☐

II. Please list your child's favorite hobbies, activities, and games, other than sports. For example: video games, dolls, reading, piano, crafts, cars, computers, singing, etc. (Do *not* include listening to radio, TV, or other media.)

☐ None

	Compared to others of the same age, about how much time does he/she spend in each?				Compared to others of the same age, how well does he/she do each one?			
	Less Than Average	Average	More Than Average	Don't Know	Below Average	Average	Above Average	Don't Know
a. _____	☐	☐	☐	☐	☐	☐	☐	☐
b. _____	☐	☐	☐	☐	☐	☐	☐	☐
c. _____	☐	☐	☐	☐	☐	☐	☐	☐

III. Please list any organizations, clubs, teams, or groups your child belongs to.

☐ None

	Compared to others of the same age, how active is he/she in each?			
	Less Active	Average	More Active	Don't Know
a. _____	☐	☐	☐	☐
b. _____	☐	☐	☐	☐
c. _____	☐	☐	☐	☐

IV. Please list any jobs or chores your child has. For example: doing dishes, babysitting, making bed, working in store, etc. (Include both paid and unpaid jobs and chores.)

☐ None

	Compared to others of the same age, how well does he/she carry them out?			
	Below Average	Average	Above Average	Don't Know
a. _____	☐	☐	☐	☐
b. _____	☐	☐	☐	☐
c. _____	☐	☐	☐	☐

Be sure you answered all items. Then see other side.

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1 South Prospect St., Burlington, VT 05401-3456
www.ASEBA.org

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Please print. Be sure to answer all items.

V. 1. About how many close friends does your child have? (Do *not* include brothers & sisters)
☐None ☐1 ☐2 or 3 ☐4 or more

2. About how many times a week does your child do things with any friends outside of regular school hours? (Do *not* include brothers & sisters) ☐Less than 1 ☐1 or 2 ☐3 or more

VI. Compared to others of his/her age, how well does your child:

	Worse	Average	Better	
a. Get along with his/her brothers & sisters?	☐	☐	☐	☐ Has no brothers or sisters
b. Get along with other kids?	☐	☐	☐	
c. Behave with his/her parents?	☐	☐	☐	
d. Play and work alone?	☐	☐	☐	

VII. 1. Performance in academic subjects. ☐Does not attend school because _____

Check a box for each subject that child takes	Failing	Below Average	Average	Above Average
a. Reading, English, or Language Arts	☐	☐	☐	☐
b. History or Social Studies	☐	☐	☐	☐
c. Arithmetic or Math	☐	☐	☐	☐
d. Science	☐	☐	☐	☐
e. _____	☐	☐	☐	☐
f. _____	☐	☐	☐	☐
g. _____	☐	☐	☐	☐

Other academic subjects–for example: computer courses, foreign language, business. Do *not* include gym, shop, driver's ed., or other nonacademic subjects.

2. Does your child receive special education or remedial services or attend a special class or special school?
☐No ☐Yes—kind of services, class, or school:

3. Has your child repeated any grades? ☐No ☐Yes—grades and reasons:

4. Has your child had any academic or other problems in school? ☐No ☐Yes—please describe:

When did these problems start?

Have these problems ended? ☐No ☐Yes–when?

Does your child have any illness or disability (either physical or mental)? ☐No ☐Yes—please describe:

What concerns you most about your child?

Please describe the best things about your child.

SAMPLE DO NOT COPY

Be sure you answered all items.

Please print. Be sure to answer all items.

Below is a list of items that describe children and youths. For each item that describes your child ***now or within the past 6 months***, please circle the ***2*** if the item is ***very true or often true*** of your child. Circle the ***1*** if the item is ***somewhat or sometimes true*** of your child. If the item is ***not true*** of your child, circle the ***0***. Please answer all items as well as you can, even if some do not seem to apply to your child.

0 = Not True (as far as you know) **1 = Somewhat or Sometimes True** **2 = Very True or Often True**

0 1 2 1. Acts too young for his/her age
0 1 2 2. Drinks alcohol without parents' approval (describe): _____
_____
0 1 2 3. Argues a lot
0 1 2 4. Fails to finish things he/she starts
0 1 2 5. There is very little he/she enjoys
0 1 2 6. Bowel movements outside toilet
0 1 2 7. Bragging, boasting
0 1 2 8. Can't concentrate, can't pay attention for long
0 1 2 9. Can't get his/her mind off certain thoughts; obsessions (describe): _____
_____
0 1 2 10. Can't sit still, restless, or hyperactive
0 1 2 11. Clings to adults or too dependent
0 1 2 12. Complains of loneliness
0 1 2 13. Confused or seems to be in a fog
0 1 2 14. Cries a lot
0 1 2 15. Cruel to animals
0 1 2 16. Cruelty, bullying, or meanness to others
0 1 2 17. Daydreams or gets lost in his/her thoughts
0 1 2 18. Deliberately harms self or attempts suicide
0 1 2 19. Demands a lot of attention
0 1 2 20. Destroys his/her own things
0 1 2 21. Destroys things belonging to his/her family or others
0 1 2 22. Disobedient at home
0 1 2 23. Disobedient at school
0 1 2 24. Doesn't eat well
0 1 2 25. Doesn't get along with other kids
0 1 2 26. Doesn't seem to feel guilty after misbehaving
0 1 2 27. Easily jealous
0 1 2 28. Breaks rules at home, school, or elsewhere
0 1 2 29. Fears certain animals, situations, or places, other than school (describe): _____
_____
0 1 2 30. Fears going to school
0 1 2 31. Fears he/she might think or do something bad
0 1 2 32. Feels he/she has to be perfect
0 1 2 33. Feels or complains that no one loves him/her
0 1 2 34. Feels others are out to get him/her
0 1 2 35. Feels worthless or inferior
0 1 2 36. Gets hurt a lot, accident-prone
0 1 2 37. Gets in many fights
0 1 2 38. Gets teased a lot
0 1 2 39. Hangs around with others who get in trouble
0 1 2 40. Hears sound or voices that aren't there (describe): _____
_____
0 1 2 41. Impulsive or acts without thinking
0 1 2 42. Would rather be alone than with others
0 1 2 43. Lying or cheating
0 1 2 44. Bites fingernails
0 1 2 45. Nervous, highstrung, or tense
0 1 2 46. Nervous movements or twitching (describe): _____
_____
0 1 2 47. Nightmares
0 1 2 48. Not liked by other kids
0 1 2 49. Constipated, doesn't move bowels
0 1 2 50. Too fearful or anxious
0 1 2 51. Feels dizzy or lightheaded
0 1 2 52. Feels too guilty
0 1 2 53. Overeating
0 1 2 54. Overtired without good reason
0 1 2 55. Overweight
56. Physical problems ***without known medical cause:***
0 1 2 a. Aches or pains (***not*** stomach or headaches)
0 1 2 b. Headaches
0 1 2 c. Nausea, feels sick
0 1 2 d. Problems with eyes (***not*** if corrected by glasses) (describe): _____
0 1 2 e. Rashes or other skin problems
0 1 2 f. Stomachaches
0 1 2 g. Vomiting, throwing up
0 1 2 h. Other (describe): _____
_____

SAMPLE DO NOT COPY

Please print. Be sure to answer all items.

0 = Not True (as far as you know) **1 = Somewhat or Sometimes True** **2 = Very True or Often True**

0 1 2 57. Physically attacks people
0 1 2 58. Picks nose, skin, or other parts of body (describe): _____
_____
0 1 2 59. Plays with own sex parts in public
0 1 2 60. Plays with own sex parts too much
0 1 2 61. Poor school work
0 1 2 62. Poorly coordinated or clumsy
0 1 2 63. Prefers being with older kids
0 1 2 64. Prefers being with younger kids
0 1 2 65. Refuses to talk
0 1 2 66. Repeats certain acts over and over; compulsions (describe): _____
_____
0 1 2 67. Runs away from home
0 1 2 68. Screams a lot
0 1 2 69. Secretive, keeps things to self
0 1 2 70. Sees things that aren't there (describe): _____
_____
_____
0 1 2 71. Self-conscious or easily embarrassed
0 1 2 72. Sets fires
0 1 2 73. Sexual problems (describe): _____
_____
_____
0 1 2 74. Showing off or clowning
0 1 2 75. Too shy or timid
0 1 2 76. Sleeps less than most kids
0 1 2 77. Sleeps more than most kids during day and/or night (describe): _____
_____
0 1 2 78. Inattentive or easily distracted
0 1 2 79. Speech problem (describe): _____
_____
0 1 2 80. Stares blankly
0 1 2 81. Steals at home
0 1 2 82. Steals outside the home
0 1 2 83. Stores up too many things he/she doesn't need (describe): _____
_____
_____
0 1 2 84. Strange behavior (describe): _____
_____
0 1 2 85. Strange ideas (describe): _____
_____
0 1 2 86. Stubborn, sullen, or irritable
0 1 2 87. Sudden changes in mood or feelings
0 1 2 88. Sulks a lot
0 1 2 89. Suspicious
0 1 2 90. Swearing or obscene language
0 1 2 91. Talks about killing self
0 1 2 92. Talks or walks in sleep (describe): _____
_____
0 1 2 93. Talks too much
0 1 2 94. Teases a lot
0 1 2 95. Temper tantrums or hot temper
0 1 2 96. Thinks about sex too much
0 1 2 97. Threatens people
0 1 2 98. Thumb-sucking
0 1 2 99. Smokes, chews, or sniffs tobacco
0 1 2 100. Trouble sleeping (describe): _____
_____
0 1 2 101. Truancy, skips school
0 1 2 102. Underactive, slow moving, or lacks energy
0 1 2 103. Unhappy, sad, or depressed
0 1 2 104. Unusually loud
0 1 2 105. Uses drugs for nonmedical purposes (***don't*** include alcohol or tobacco) (describe): _____
_____
_____
0 1 2 106. Vandalism
0 1 2 107. Wets self during the day
0 1 2 108. Wets the bed
0 1 2 109. Whining
0 1 2 110. Wishes to be of opposite sex
0 1 2 111. Withdrawn, doesn't get involved with others
0 1 2 112. Worries
113. Please write in any problems your child has that were not listed above:
0 1 2 _____
0 1 2 _____
0 1 2 _____

SAMPLE DO NOT COPY

Please be sure you answered all items.

Strengths and Difficulties Questionnaire

P 4-17

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of the child's behaviour over the last six months.

Child's Name ..... Male/Female

Date of Birth.....

	Not True	Somewhat True	Certainly True
Considerate of other people's feelings	☐	☐	☐
Restless, overactive, cannot stay still for long	☐	☐	☐
Often complains of headaches, stomach-aches or sickness	☐	☐	☐
Shares readily with other children (treats, toys, pencils etc.)	☐	☐	☐
Often has temper tantrums or hot tempers	☐	☐	☐
Rather solitary, tends to play alone	☐	☐	☐
Generally obedient, usually does what adults request	☐	☐	☐
Many worries, often seems worried	☐	☐	☐
Helpful if someone is hurt, upset or feeling ill	☐	☐	☐
Constantly fidgeting or squirming	☐	☐	☐
Has at least one good friend	☐	☐	☐
Often fights with other children or bullies them	☐	☐	☐
Often unhappy, down-hearted or tearful	☐	☐	☐
Generally liked by other children	☐	☐	☐
Easily distracted, concentration wanders	☐	☐	☐
Nervous or clingy in new situations, easily loses confidence	☐	☐	☐
Kind to younger children	☐	☐	☐
Often lies or cheats	☐	☐	☐
Picked on or bullied by other children	☐	☐	☐
Often volunteers to help others (parents, teachers, other children)	☐	☐	☐
Thinks things out before acting	☐	☐	☐
Steals from home, school or elsewhere	☐	☐	☐
Gets on better with adults than with other children	☐	☐	☐
Many fears, easily scared	☐	☐	☐
Sees tasks through to the end, good attention span	☐	☐	☐

Do you have any other comments or concerns?

Please turn over - there are a few more questions on the other side

Student Services Department
181 Encinal Avenue, Atherton, CA 94027
(650) 321-7140 Fax: (650) 292-2200

SEIZURE QUESTIONNAIRE

Please return this form to the school office immediately. Call the school nurse if you want to discuss this further.

Date _____

Check Site: ☐Heritage Oak ☐Laurel ☐Encinal ☐Oak Knoll ☐Hillview

Please print:

Student: _____ Grade _____

Teacher: _____ Room _____

Parent phone _____ Emergency phone # _____

School records indicate that your child has a seizure disorder. In order to help us provide the best care for your child, please complete the following information.

1. What type of seizure does your child have?
   - ☐ Generalized
   - ☐ Convulsive/Grand Mal
   - ☐ Partial Complex
   - ☐ Absence/Petit Mal
2. Age of child when diagnosed with seizures/epilepsy: _____
3. When was the last seizure? _____
4. How often does your child have a seizure? _____
5. How long does the seizure last? _____
6. Description of seizure (for example, affects both sides of body, affects one body part, does child lose consciousness or black out). Use other side if needed. _____
   _____
7. What seizure medications does your child take? Use other side if needed.
   Medication: _____ Dose _____ Time _____
   Medication: _____ Dose _____ Time _____
8. What is your child's behavior after a seizure (for example, sleepy disoriented, confused, upset)?
   _____
9. If your child needs medication at school, a *Medication Authorization Form* must be completed and returned to the school office with the medication. The Medication Authorization Form may be found on the district web site at district.mpcsd.org.

Form filled out by _____ _____ _____
Signature **Telephone** **Date**

_____ Relationship to student: _____
Print Name

PATIENT INFORMATION SHEET

Place of study: Institute Of Child Health And Hospital for Children, Egmore, Chennai-8.

Name of Investigator: DR.RAMESH KRISHNAN.B

Name of Participant: **Age**: **Sex**:

Hospital No:

Study title

We request your child to participate in the study.

Aim of the study –

To compare the clinical & neurobehavioral profile of children with seizure disorder versus healthy controls in a tertiary health care centre

Methods-

This study aims at comparing the neurobehavioral comorbidities in children with seizure disorder versus healthy controls using questionnaires & confirmation will be performed by child psychiatrist

Can I refuse to participate in the study?

Participation in the study is purely voluntary. You may refuse to participate or withdraw from the study at any time. In both cases the treatment and care your child receives from this hospital will not be affected in any manner.

Benefits and harms of participating in the study-

Your child will not benefit directly by participating in this study. But by way of participating in this study, your child is contributing to

information which when compiled, will yield useful information and will help in early identification and treatment to reduce the distress associated with the condition.

Confidentiality-

The data collected from the study will be used for the purpose of study only. The results of the study will be published. Personal information of the children and parents participating in the study will be kept confidential. There will not be any disclosure about your child's information without your permission.

Subject rights-

If you wish further information regarding your child's rights as a research participant, you may contact the principal investigator in the mobile number or addressmentioned below.

Principal Investigator	-	Dr.RAMESH KRISHNAN.B
Mobile number	-	9940781752
Contact Address	-	Post graduate of Paediatrics, Institute of Child Health and Hospital for Children, Halls road, Egmore, Chennai.

Place:

Date: Signature of Parent

INFORMED CONSENT FORM

Study place : Institute Of Child Health And Hospital For Children, Egmore,Chennai-8.

Title of the study:

A COMPARATIVE STUDY OF THE CLINICAL & NEUROBEHAVIORAL PROFILE OF CHILDREN WITH SEIZURE DISORDER Vs HEALTHY CONTROLS IN A TERTIARY HEALTH CARE CENTRE

Name of the investigator : Dr.RAMESH KRISHNAN.B

Name of the Participant : **Age**: **Sex**:

Hospital number:

1. I have read and understood the patient information sheet provided to me regarding the participation of my child in the study.
2. I have been explained about the nature of the study and had my questions answered to my satisfaction.
3. I have been explained about my rights and responsibilities by the investigator.
4. I will allow my child tocooperate with the investigatorand undergo clinical tests subjected during the study whole heartedly.
5. I have been advised about the risks associated with my child's participation in this study.*
6. I am aware of the fact that I can opt out of the study at any time without having to give any reason and this will not affect my child's future treatment in this hospital. *
7. I hereby give permission to the investigators to release the information obtained from my child as result of participation in this study to medical journals/conference proceedings.

8. I understand that my child's identity will be kept confidential if my child's data are publicly presented/published.
9. I have decided my child can participate in the research study. I am aware that if I have any question during this study, I should contact the investigator.
10. By signing this consent form I attest that the information given in this document has been clearly explained to me and understood by me, I will be given a copy of this consent document.

Name and signature / thumb impression of the parent/guardian

Name _____ Signature_____

Date _____

Name and Signature of the investigator

Name _____ Signature_____

Date _____

Name and Signature of impartial witness 1:

Name _____ Signature_____

Date _____

Name and Signature of impartial witness 2:

Name _____ Signature_____

Date _____

தகவல் படிவம்

ஆய்விடம் : அரசு குழந்தைகள் நல மருத்துவமனை மற்றும் ஆராய்ச்சி நிலையம், எழும்பூர், சென்னை 8

ஆய்வாளர் : மரு. பா. ரமேஷ் கிருஷ்ணன்

பங்குபெறுபவரின் பெயர் : வயது : பாலினம் :

மருத்துவமனை எண் : குருதியியல் எண்:

ஆய்வு தலைப்பு :

ஒரு மூன்றாம் நிலை சுகாதார மையத்தில் ஆரோக்கியமான குழந்தைகள் மற்றும் வலிப்புத்தாக்குதல் சீர்குலைவு கொண்ட குழந்தைகளின் மருத்துவ மற்றும் நரம்பியல் நலன் தொடர்பான ஒரு ஒப்பீட்டு ஆய்வு.

நான் தங்கள் குழந்தையும் இந்த ஆய்வில் பங்குபெற கேட்டு கொள்கின்றோம்.

செய்முறை:

குழந்தைகளின் மனநலம் சம்மபந்தமான கேள்வித்தாள்களை பயன்படுத்தி ஆரோக்கியமான குழந்தைகள் மற்றும் வலிப்புத்தாக்கக் குறைபாடுகள் உள்ள குழந்தைகளில் நரம்பியல் நல்வாழ்வுகளை ஒப்பிடுவதே இந்த ஆய்வின் நோக்கமாகும்.

இரகசியத்தன்மை:

உங்கள் குழந்தையைப் பற்றிய தனிப்பட்ட விவரங்கள் யாருக்கும் தெரிவிக்காமல் பாதுகாக்கப்படும்.

ஆய்வில் பங்கேற்க மறுத்தல்:

இந்த ஆய்வில் பங்கு பெறுவது உங்கள் தனிப்பட்ட விருப்பமே. ஆய்வு ஆரம்பித்தபின் விருப்பம் இல்லை என்றால் தாங்கள் விலகிக்கொள்ளலாம். அவ்வாறு விலகுவதானது தங்கள் குழந்தையின் சிகிச்சைக்கு எவ்வித பாதிப்பையும் உருவாக்காது.

பங்கேற்பதின் இலாப நஷ்டங்கள்:

இந்த ஆய்வில் பங்கேற்பதால் தங்கள் குழந்தைக்கு எந்த பலனும் இல்லை .ஆய்வின் முடிவுகள் ஆய்வு நடக்கும்போதோ(தேவை ஏற்படின்) அல்லது ஆய்வு முடிந்த பின்னரோ தங்களுக்கு தெரிவிக்கப்படும். அந்த முடிவுகள் தங்கள் குழந்தை மற்றும் இந்த நோயால் பாதிக்கப்பட்ட மற்ற குழந்தைக்களின் சிகிச்சைக்கு பேருதவியாக இருக்கக்கூடும்.

பங்கேற்பவர் உரிமை:

தங்கள் குழந்தை பற்றிய விவரம் தெரிய ஆய்வு மருத்துவரை அணுகலாம்.

ஆய்வாளரின் பெயர் : மரு. பா. ரமேஷ் கிருஷ்ணன்

கைபேசி எண் : 9940781752

முகவரி : முதுநிலை பட்டமேற்படிப்பு மாணவர் ,அரசு குழந்தை நல ஆராய்ச்சி நிலையம் மற்றும் குழந்தை நல மருத்துவமனை , எழும்பூர் . சென்னை 8.

ஆய்வாளரின் கையொப்பம் பெற்றோரின் கையொப்பம்

நாள்
இடம்

ஒப்புதல் படிவம்

ஆய்விடம் : அரசு குழந்தைகள் நல மருத்துவமனை மற்றும் ஆராய்ச்சி நிலையம்.
எழும்பூர் , சென்னை 8

ஆய்வாளர் : மரு. பா. ரமேஷ் கிருஷ்ணன்

பங்குபெறுபவரின் பெயர் : வயது : பாலினம் :

மருத்துவமனை எண் : குருதியியல் எண்:

ஆய்வு தலைப்பு :

ஒரு மூன்றாம் நிலை சுகாதார மையத்தில் ஆரோக்கியமான குழந்தைகள் மற்றும் வலிப்புத்தாக்குதல் சீர்குலைவு கொண்ட குழந்தைகளின் மருத்துவ மற்றும் நரம்பியல் நலன் தொடர்பான ஒரு ஒப்பீட்டு ஆய்வு.

1) எனக்கு தரப்பட்ட ஆராய்ச்சியில் பங்கு பெறுவோர்க்கான தகவல் படிவத்தை முழுமையாக படித்து புரிந்து கொண்டேன்.
2) ஆராய்ச்சியின் தன்மை முழுமையாகவும் விரிவாகவும் எடுத்துரைக்கப்பட்டது .
3) எனது எல்லா கேள்விகளுக்கும் விடையளிக்கப்பட்டது .
4) ஆய்வாளர் என் உரிமைகளையும் , பொறுப்புகளையும் நன்கு விளக்கினார்
5) நன் , என் குழந்தை , ஆய்வாளருக்கு முழு ஒத்துழைப்பு கொடுக்கவும் , பரிசோதனை செய்துகொள்ளவும் அனுமதிக்கிறேன்
6) என் குழந்தைக்கு இரத்த பரிசோதனை , எலும்பு மச்சை ஆய்வு , ஊடுகதிர் படம் , கணினி வலி ஊடுகதிர் படம் மற்றும் தேவைக்கான பரிசோதனைகள் செத்துக்கொள்ள முழு மனதுடன் சம்மதம் தெரிவிக்கிறேன்.
7) எனது குழைந்தை ஆராய்ச்சியில் பங்கேற்பதால் ஏற்படும் சாதக பாதங்களை ஆய்வாளர் விளக்கிக்கூற அறிந்துகொண்டேன்
8) எப்பொழுது வேண்டுமானாலும் என் குழந்தையை இந்த ஆய்வில் இருந்து விலக்கி கொள்ளலாம் என்பதை அறிவேன் . அவ்வாறு விளக்கிக்கொள்வதால் குழந்தைக்கு கொடுக்கப்படும் சிகிட்சையில் எந்த மாற்றமும் இருக்காது என அறிந்து கொண்டேன்
9) இந்த ஆய்வுக்காக பெறப்படும் என் குழந்தையின் தகவல்களை ஆய்விதழ்களிலேயோ , கருத்தரங்கிலேயோ வெளியிடுவதில் எனக்கு எந்தவித மறுப்போ , ஆட்சேபணையோ இல்லை .

10) என் குழந்தையின் தன் அடையாளங்கள் ஆய்விதழ்களிலேயோ. கருத்தரங்கிலேயோ வெளியிடப்பட மாட்டாது என் எனக்கு உறுதியளிக்கப்பட்டது .

11) எனக்கு இந்த ஆராய்ச்சி குறித்தன சந்தேகம் இருந்தால் உடனே ஆய்வாளரை கேட்டு தெளிவுபடுத்தி கொள்ளலாம் என உறுதியளிக்கப்பட்டது

12) இந்த ஒப்புதல் படிவத்தில் கையொப்பமிடுவதின் மூலம் இந்த படிவத்தில் உள்ளவை யாவும் எனக்கு தெளிவாக எடுத்துரைக்கப்பட்டது , அதை நான் நன்கு புரிந்து கொண்டேன் என தெரிவித்துக்கொள்கிறேன்

நோயாளியின் பெற்றோர் / பாதுகாவலர்

பெயர் கையொப்பம்/ பெருவிரல் சுவடு தேதி

ஆராய்ச்சியாளர்

பெயர் கையொப்பம்/ பெருவிரல் சுவடு தேதி

சாட்சி 1

பெயர் கையொப்பம்/ பெருவிரல் சுவடு தேதி

சாட்சி 2

பெயர் கையொப்பம்/ பெருவிரல் சுவடு தேதி

MASTER CHART

S.NO	AGE	SEX	SINGLE AED	MULTIPLE AED	CONTROL	DCDQ	QOLCE	CBCL	SDQ	EMOTIONAL	CONDUCT	HYPERACTIVITY	PROBLEMS	PROSOCIAL	RESULT	TYPE OF SEIZURE	AGE OF SEIZURE ONSET	DURATION OF SEIZURES	SEIZURE FREQUENCY	LAST EPISODE	MONO/POLY	ON DRUGS FOR	DRUGS
1	7	MALE	YES			75	31.36	64	26	4	7	9	6	4	ABNORMAL	GTCS	3 YEARS	<5 MIN	RARELY	2 YEARS BACK	MONO	4 YEARS	SVP 200 MG 1-0-1
2	8	MALE	YES			75	25.45	72	24	1	7	10	6	2	ABNORMAL	GTCS	4 YEARS	<3 MIN	2 YEARLY	7 MONTHS BACK	MONO	4 YEARS	SVP 200MG 1.5-0-1.5
3	10	MALE	YES			75	70	4	2	0	0	1	1	10	NORMAL	GTCS	4 YEARS	<5 MIN	RARELY	2 YEARS BACK	MONO	6 YEARS	SVP 200MG 0.5-0-1
4	10	MALE	YES			75	40	31	13	1	4	5	2	8	ABNORMAL	GTCS	8 YEARS	<5 MIN	6 MONTHLY	7 MONTHS BACK	MONO	2 YEARS	SVP 200MG 1-0-1
5	11	MALE	YES			75	68	1	3	0	1	2	0	10	NORMAL	GTCS	9 YEARS	<2 MIN	YEARLY	7 MONTHS BACK	MONO	2 YEARS	SVP 200 MG 1-0-1.5
6	12	MALE	YES			75	71.81	0	1	0	0	0	1	10	NORMAL	GTCS	10 YEARS	<5 MIN	6 MONTHLY	6 MONTHS BACK	MONO	2 YEARS	SVP 200MG 0.5-0-1
7	12	MALE	YES			69	42.72	29	14	2	4	7	1	8	ABNORMAL	GTCS	9 YEARS	<5 MIN	RARELY	2 YEARS BACK	MONO	3 YEARS	SVP 200MG 0.5-0-0.5
8	7	FEMALE	YES			69	67.72	6	6	1	2	2	1	8	NORMAL	GTCS	5 YEARS	<5 MIN	YEARLY	7 MONTHS BACK	MONO	2 YEARS	SVP 200MG 1.5-0-1.5
9	6	FEMALE	YES			75	85.45	0	2	0	0	1	1	9	NORMAL	GTCS	6 YEARS	<10 MIN	RARELY	1.5 YEARS BACK	MONO	2 YEARS	SVP 200MG 0.5-0-0.5
10	9	FEMALE	YES			75	85.45	0	2	0	0	0	2	10	NORMAL	GTCS	7 YEARS	<10 MIN	6 MONTHLY	6 MONTHS BACK	MONO	2 YEARS	SVP 200MG 1-0-1
11	8	MALE	YES			75	27.72	70	24	1	8	9	6	0	ABNORMAL	GTCS	5 YEARS	<30 SEC	6 MONTHLY	7 MONTHS BACK	MONO	3 YEARS	SVP 200MG 1-0-1
12	6	MALE	YES			75	86.81	0	1	0	0	0	1	10	NORMAL	PARTIAL	5 YEARS	<2 MIN	6 MONTHLY	7 MONTHS BACK	MONO	1 YEAR	SVP 200MG 0.5-0-0.5
13	9	MALE	YES			75	25.9	80	24	0	8	9	7	2	ABNORMAL	GTCS	5 YEARS	<5 MIN	YEARLY	1 YEAR BACK	MONO	4 YEARS	SVP 200MG 1-0-1
14	9	MALE	YES			75	84.09	0	1	0	0	0	1	10	NORMAL	PARTIAL	7 YEARS	<5 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 0.25-0-0.25
15	10	MALE	YES			75	83.63	0	1	0	0	0	1	10	NORMAL	PARTIAL	8 YEARS	<2 MIN	YEARLY	1 YEAR BACK	MONO	2 YEARS	SVP 200MG 0.75-0-0.75
16	12	MALE	YES			75	24.09	55	25	2	8	9	6	2	ABNORMAL	GTCS	7 YEARS	<5 MIN	YEARLY	1 YEAR BACK	MONO	5 YEARS	SVP 200MG 1.5-0-1.5
17	8	FEMALE	YES			75	31.81	76	26	1	8	9	6	2	ABNORMAL	GTCS	4 YEARS	<5 MIN	YEARLY	1 YEAR BACK	MONO	4 YEARS	SVP 200MG 1.5-0-1
18	8	FEMALE	YES			75	86.81	0	1	0	0	0	1	10	NORMAL	PARTIAL	6 YEARS	<5 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 0.5-0-0.5
19	10	FEMALE	YES			75	87.27	0	0	0	0	0	0	10	NORMAL	PARTIAL	9 YEARS	<3 MIN	YEARLY	1 YEAR BACK	MONO	1 YEAR	SVP 200MG 0.5-0-0.5
20	11	FEMALE	YES			75	87.72	0	1	0	0	0	1	10	NORMAL	PARTIAL	10 YEARS	<3 MIN	YEARLY	1 YEAR BACK	MONO	1 YEAR	SVP 200MG 0.75-0-0.75
21	8	MALE	YES			75	30.45	77	23	2	6	10	5	3	ABNORMAL	GTCS	4 YEARS	<2 MIN	YEARLY	1 YEAR BACK	MONO	4 YEARS	SVP 200MG 0.5-0-0.5
22	9	MALE	YES			75	25.45	79	25	2	7	10	6	2	ABNORMAL	PARTIAL	6 YEARS	<2 MIN	6 MONTHLY	6 MONTHS BACK	MONO	3 YEARS	SVP 200MG 1-0-1
23	9	MALE	YES			75	86.81	0	0	0	0	0	0	10	NORMAL	GTCS	7 YEARS	<5 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 0.5-0-1
24	10	MALE	YES			75	86.81	0	0	0	0	0	0	10	NORMAL	GTCS	7 YEARS	<5 MIN	RARELY	3 YEARS BACK	MONO	3 YEARS	SVP 200MG 0.75-0-0.75
25	6	FEMALE	YES			75	30.9	59	26	2	7	10	7	3	ABNORMAL	CONVULSIVE	3.5 YEARS	10 MIN	RARELY	2 YEARS BACK	MONO	2.5 YEARS	SVP 200MG 0.25-0-0.25
26	7	FEMALE	YES			75	86.81	0	0	0	0	0	0	10	NORMAL	PARTIAL	5 YEARS	<2 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 0.5-0-0.5
27	7	FEMALE	YES			75	32.27	71	27	2	7	10	6	2	ABNORMAL	CONVULSIVE	3 YEARS	<5 MIN	YEARLY	1.5 YEARS BACK	MONO	4 YEARS	SVP 200MG 0.5-0-0.5
28	8	FEMALE	YES			75	89.09	0	0	0	0	0	0	10	NORMAL	PARTIAL	6 YEARS	<5 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 0.5-0-0.5
29	11	FEMALE	YES			75	88.63	0	0	0	0	0	0	10	NORMAL	PARTIAL	8 YEARS	<5 MIN	RARELY	1 YEAR BACK	MONO	3 YEARS	SVP 200MG 1.5-0-1
30	12	FEMALE	YES			75	89.09	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	10 YEARS	15 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 1.5-0-1
31	7	MALE	YES			75	86.36	0	1	0	0	0	1	10	NORMAL	PARTIAL	6 YEARS	<3 MIN	YEARLY	1 YEAR BACK	MONO	1 YEAR	SVP 200MG 0.5-0-0.5
32	7	MALE	YES			75	31.36	93	29	2	9	10	8	0	ABNORMAL	CONVULSIVE	3 YEARS	15 MIN	YEARLY	6 MONTHS BACK	MONO	4 YEARS	SVP 200MG 0.5-0-0.5
33	8	MALE	YES			75	31.81	82	29	2	9	10	8	0	ABNORMAL	GTCS	3 YEARS	<2 MIN	YEARLY	6 MONTHS BACK	MONO	5 YEARS	SVP 200MG 1-0-1
34	9	MALE	YES			75	31.81	83	26	1	8	10	7	0	ABNORMAL	GTCS	6 YEARS	<5 MIN	YEARLY	1 YEAR BACK	MONO	3 YEARS	SVP 200MG 1.5-0-1.5
35	6	FEMALE	YES			75	86.81	0	0	0	0	0	0	10	NORMAL	GTCS	4 YEARS	<5 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 0.25-0-0.25
36	9	FEMALE	YES			75	86.81	0	0	0	0	0	0	10	NORMAL	PARTIAL	8 YEARS	<2 MIN	YEARLY	1 YEAR BACK	MONO	1 YEAR	SVP 200MG 0.5-0-0.5
37	10	FEMALE	YES			75	31.36	86	29	2	9	10	8	0	ABNORMAL	CONVULSIVE	5 YEARS	20 MIN	YEARLY	1 YEAR BACK	MONO	5 YEARS	SVP 200MG 1.5-0-1.5
38	11	FEMALE	YES			75	86.81	0	0	0	0	0	0	10	NORMAL	PARTIAL	9 YEARS	<2 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 0-0-0.5
39	12	FEMALE	YES			75	85.9	0	0	0	0	0	0	10	NORMAL	PARTIAL	11 YEARS	<2 MIN	YEARLY	1 YEAR BACK	MONO	1 YEAR	SVP 200MG 1-0-0.5
40	12	FEMALE	YES			75	85.9	0	0	0	0	0	0	10	NORMAL	PARTIAL	10 YEARS	<3 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 0.75-0-0.75
41	7	MALE	YES			75	86.81	0	0	0	0	0	0	10	NORMAL	PARTIAL	5 YEARS	<2 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 0-0-0.5
42	7	MALE	YES			69	15	94	29	3	9	10	7	0	ABNORMAL	GTCS	3 YEARS	<5 MIN	YEARLY	1 YEAR BACK	MONO	4 YEARS	SVP 200MG 0.5-0-0.5
43	8	MALE	YES			69	14.54	95	29	3	9	10	7	0	ABNORMAL	GTCS	3 YEARS	<5 MIN	YEARLY	1 YEAR BACK	MONO	5 YEARS	SVP 200MG 1-0-1
44	9	MALE	YES			69	25.45	76	29	3	9	10	7	0	ABNORMAL	GTCS	4 YEARS	<5 MIN	YEARLY	1 YEAR BACK	MONO	5 YEARS	SVP 200MG 0.5-0-1
45	10	MALE	YES			75	87.27	0	0	0	0	0	0	10	NORMAL	PARTIAL	8 YEARS	<2 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 0.5-0-0.5
46	8	FEMALE	YES			75	87.27	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	4 YEARS	15 MIN	RARELY	4 YEARS BACK	MONO	4 YEARS	SVP 200MG 0-0-0.25
47	9	FEMALE	YES			75	86.81	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	8 YEARS	15 MIN	RARELY	3 YEARS BACK	MONO	3 YEARS	SVP 200MG 0-0-0.5
48	10	FEMALE	YES			69	30.9	93	28	3	8	10	7	0	ABNORMAL	CONVULSIVE	4 YEARS	10 MIN	RARELY	1.5 YEARS BACK	MONO	6 YEARS	SVP 200MG 1-0-1.5
49	11	FEMALE	YES			75	87.27	0	0	0	0	0	0	10	NORMAL	PARTIAL	9 YEARS	<2 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 0-0-0.5
50	12	FEMALE	YES			75	87.72	0	0	0	0	0	0	10	NORMAL	PARTIAL	10 YEARS	<5 MIN	RARELY	2 YEARS BACK	MONO	2 YEARS	SVP 200MG 0.5-0-0.5

1	6	MALE		YES		64	30.9	64	23	4	7	9	3	5	ABNORMAL	GTCS	5 YEARS	<5 MIN	2 MONTHLY	1 MONTH BACK	POLY	1 YEAR	SVP 200MG 1-0-0
2	7	MALE		YES		75	86.36	0	0	0	0	0	0	10	NORMAL	GTCS	4 YEARS	<5 MIN	RARELY	2 YEARS BACK	POLY	3 YEARS	PHENYTOIN 100MG 0-0-1
3	8	MALE		YES		75	15	62	25	1	8	10	6	3	ABNORMAL	GTCS	5 YEARS	<3 MIN	6 MONTHLY	1 YEAR BACK	POLY	3 YEARS	SVP 200MG 1-0-1
4	8	MALE		YES		38	36	55	27	5	7	9	6	2	ABNORMAL	CONVULSIVE	5 YEARS	10 MIN	3 MONTHLY	2 WEEKS BACK	POLY	3 YEARS	SVP 200MG 1-0-1
5	9	MALE		YES		75	23.63	82	28	2	9	10	7	0	ABNORMAL	GTCS	5 YEARS	<5 MIN	YEARLY	6 MONTHS BACK	POLY	4 YEARS	SVP 200MG 1-0-1
6	11	MALE		YES		75	65.45	12	11	1	4	3	3	9	NORMAL	GTCS	9 YEARS	<5 MIN	4 MONTHLY	1 MONTH BACK	POLY	2 YEARS	SVP 200MG 1.5-0-1.5
7	12	MALE		YES		75	69.09	0	2	0	1	0	1	10	NORMAL	GTCS	10 YEARS	<2 MIN	YEARLY	1 YEAR BACK	POLY	2 YEARS	PHENYTOIN 100MG 0-0-1
8	9	FEMALE		YES		75	79.54	0	0	0	0	0	0	10	NORMAL	GTCS	5 YEARS	<3 MIN	YEARLY	1 YEAR BACK	POLY	4 YEARS	PHENYTOIN 100MG 0.5-0-0.5
9	10	FEMALE		YES		66	36.81	53	25	8	5	8	4	6	ABNORMAL	CONVULSIVE	7 YEARS	15 MIN	YEARLY	1 YEAR BACK	POLY	3 YEARS	LEVITIRACETAM 250MG 1-0-1
10	10	FEMALE		YES		75	86.81	0	2	0	0	2	0	10	NORMAL	GTCS	9 YEARS	<5 MIN	3 MONTHLY	3 MONTHS BACK	POLY	1 YEAR	SVP 200MG 0.5-0-1
11	8	MALE		YES		75	20.9	75	25	1	8	10	8	1	ABNORMAL	GTCS	3 YEARS	<5 MIN	YEARLY	1 YEAR BACK	POLY	5 YEARS	SVP 200MG 1-0-0
12	9	MALE		YES		75	24.54	75	27	2	7	10	8	2	ABNORMAL	GTCS	4 YEARS	<5 MIN	6 MONTHLY	6 MONTHS BACK	POLY	5 YEARS	LEVITIRACETAM 250MG 1-1-1
13	10	MALE		YES		75	16.36	75	26	2	6	10	8	1	ABNORMAL	CONVULSIVE	2 YEARS	10 MIN	YEARLY	1 YEAR BACK	POLY	8 YEARS	SVP 200MG 0.5-0-1
14	7	FEMALE		YES		75	86.36	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	2 YEARS	10 MIN	6 MONTHLY	6 MONTHS BACK	POLY	5 YEARS	SVP 200MG 1-0-0
15	8	FEMALE		YES		75	65.45	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	6 YEARS	15 MIN	YEARLY	1 YEAR BACK	POLY	2 YEARS	SVP 200MG 0.5-0-0.5
16	9	FEMALE		YES		75	21.36	82	28	3	8	10	7	1	ABNORMAL	GTCS	3 YEARS	<2 MIN	6 MONTHLY	7 MONTHS BACK	POLY	6 YEARS	SVP 200MG 1-0-1
17	10	FEMALE		YES		75	15	86	27	2	8	10	7	2	ABNORMAL	GTCS	5 YEARS	<5 MIN	YEARLY	1 YEAR BACK	POLY	5 YEARS	LEVITIRACETAM 250MG 1.5-0-1.5
18	10	FEMALE		YES		65	75.45	37	13	4	3	5	1	9	NORMAL	CONVULSIVE	7 YEARS	15 MIN	YEARLY	1 YEAR BACK	POLY	3 YEARS	SVP 200MG 1.5-0-1
19	11	FEMALE		YES		75	86.36	0	0	0	0	0	0	10	NORMAL	PARTIAL	5 YEARS	<2 MIN	6 MONTHLY	6 MONTHS BACK	POLY	6 YEARS	SVP 200MG 1-0-1
20	12	FEMALE		YES		75	53.63	9	6	0	3	2	1	10	NORMAL	GTCS	6 YEARS	<5 MIN	WEEKLY	YESTERDAY	POLY	6 YEARS	SVP 200MG 0.5-0-1
21	8	MALE		YES		70	31.36	87	28	1	8	10	9	0	ABNORMAL	CONVULSIVE	3 YEARS	20 MIN	YEARLY	1 YEAR BACK	POLY	5 YEARS	LEVITIRACETAM 250MG 1.5-0-1.5
22	8	MALE		YES		61	15.45	84	29	3	8	10	8	3	ABNORMAL	GTCS	6 YEARS	<5 MIN	YEARLY	1 YEAR BACK	POLY	2 YEARS	LEVITIRACETAM 250MG 0.5-0.5-0.5
23	9	MALE		YES		75	31.36	87	28	2	8	10	8	0	ABNORMAL	GTCS	4 YEARS	<5 MIN	YEARLY	6 MONTHS BACK	POLY	5 YEARS	LEVITIRACETAM 250MG 0.75-0.75-0.75
24	10	MALE		YES		75	86.81	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	7 YEARS	10 MIN	RARELY	2 YEARS BACK	POLY	3 YEARS	LEVITIRACETAM 250MG 1-0-1
25	12	MALE		YES		75	86.36	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	10 YEARS	10 MIN	RARELY	2 YEARS BACK	POLY	2 YEARS	LEVITIRACETAM 250MG 1-0-1
26	7	FEMALE		YES		75	85.9	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	5 YEARS	15 MIN	RARELY	2 YEARS BACK	POLY	2 YEARS	PHENYTOIN 100MG 0.25-0-0.25
27	8	FEMALE		YES		75	86.36	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	6 YEARS	10 MIN	RARELY	2 YEARS BACK	POLY	2 YEARS	PHENYTOIN 100MG 0.25-0-0.25
28	10	FEMALE		YES		60	14.54	79	26	1	8	10	7	0	ABNORMAL	CONVULSIVE	4 YEARS	20 MIN	YEARLY	1 YEAR BACK	POLY	6 YEARS	LEVITIRACETAM 250MG 1-1-1
29	11	FEMALE		YES		75	32.27	91	27	2	8	10	7	0	ABNORMAL	CONVULSIVE	3.5 YEARS	15 MIN	YEARLY	6 MONTHS BACK	POLY	7 YEARS	LEVITIRACETAM 250MG 1-1-1
30	12	FEMALE		YES		75	30	87	29	2	8	10	9	0	ABNORMAL	CONVULSIVE	7 YEARS	15 MIN	YEARLY	3 MONTHS BACK	POLY	5 YEARS	PHENYTOIN 100MG 1-0-1
31	7	MALE		YES		69	15.45	90	32	4	10	10	8	0	ABNORMAL	GTCS	4 YEARS	<5 MIN	YEARLY	1 YEAR BACK	POLY	3 YEARS	LEVITIRACETAM 250MG 0.75-0.75-0.75
32	8	MALE		YES		69	15.45	89	30	4	9	10	7	0	ABNORMAL	GTCS	3.5 YEARS	<5 MIN	6 MONTHLY	3 MONTHS BACK	POLY	5 YEARS	LEVITIRACETAM 250MG 0.5-0.5-0.5
33	9	MALE		YES		69	31.36	91	29	3	9	10	7	3	ABNORMAL	CONVULSIVE	2.5 YEARS	15 MIN	6 MONTHLY	6 MONTHS BACK	POLY	7 YEARS	LEVITIRACETAM 250MG 1-1-1
34	10	MALE		YES		75	86.36	0	0	0	0	0	0	10	NORMAL	GTCS	5 YEARS	<5 MIN	YEARLY	1 YEAR BACK	POLY	5 YEARS	SVP 200MG 1-0-1
35	11	MALE		YES		75	86.81	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	8 YEARS	10 MIN	RARELY	3 YEARS BACK	POLY	3 YEARS	LEVITIRACETAM 250MG 1-0-1
36	11	MALE		YES		69	15.45	90	28	3	8	10	7	0	ABNORMAL	PARTIAL	6 YEARS	<5 MIN	YEARLY	1 YEAR BACK	POLY	5 YEARS	SVP 200MG 1-0-1
37	12	FEMALE		YES		69	16.81	91	32	4	10	10	8	0	ABNORMAL	GTCS	3 YEARS	<2 MIN	YEARLY	6 MONTHS BACK	POLY	9 YEARS	SVP 200MG 1.5-0-1.5
38	10	FEMALE		YES		69	15.9	91	31	4	9	10	8	0	ABNORMAL	CONVULSIVE	4 YEARS	15 MIN	6 MONTHLY	3 MONTHS BACK	POLY	6 YEARS	LEVITIRACETAM 250MG 1-1-1
39	8	FEMALE		YES		75	86.81	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	6 YEARS	10 MIN	RARELY	2 YEARS BACK	POLY	2 YEARS	PHENYTOIN 100MG 0.5-0-0.5
40	9	FEMALE		YES		75	85.9	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	8 YEARS	10 MIN	YEARLY	1 YEAR BACK	POLY	1 YEAR	LEVITIRACETAM 250MG 1-1-1
41	6	MALE		YES		69	16.16	96	28	3	8	10	7	0	ABNORMAL	GTCS	1.5 YEARS	<5 MIN	YEARLY	1 YEAR BACK	POLY	5 YEARS	PHENOBARBITONE 30MG 1-0-1
42	7	MALE		YES		75	85.9	0	0	0	0	0	0	10	NORMAL	GTCS	4 YEARS	<5 MIN	YEARLY	1 YEAR BACK	POLY	3 YEARS	SVP 200MG 0.5-0-0.5
43	7	MALE		YES		69	14.54	92	28	3	8	10	7	0	ABNORMAL	CONVULSIVE	3 YEARS	20 MIN	6 MONTHLY	3 MONTHS BACK	POLY	4 YEARS	PHENYTOIN 100MG 0.5-0-0.5
44	8	MALE		YES		69	15.45	91	26	2	7	10	7	0	ABNORMAL	GTCS	3 YEARS	<2 MIN	6 MONTHLY	6 MONTHS BACK	POLY	5 YEARS	LEVITIRACETAM 250MG 1.5-0-1.5
45	8	FEMALE		YES		69	15.45	95	28	3	8	10	7	0	ABNORMAL	GTCS	4 YEARS	<5 MIN	6 MONTHLY	6 MONTHS BACK	POLY	4 YEARS	SVP 200MG 0.5-0-1
46	9	FEMALE		YES		75	85.45	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	7 YEARS	10 MIN	RARELY	2 YEARS BACK	POLY	2 YEARS	SVP 200MG 0.5-0-0.5
47	10	FEMALE		YES		75	87.27	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	8 YEARS	15 MIN	RARELY	2 YEARS BACK	POLY	2 YEARS	SVP 200MG 1-0-1
48	10	FEMALE		YES		69	15	94	28	3	8	10	7	0	ABNORMAL	GTCS	6 YEARS	<5 MIN	YEARLY	1 YEAR BACK	POLY	4 YEARS	SVP 200MG 1-0-1
49	11	FEMALE		YES		69	14.09	88	28	3	8	10	7	0	ABNORMAL	CONVULSIVE	4 YEARS	20 MIN	YEARLY	1 YEAR BACK	POLY	7 YEARS	LEVITIRACETAM 250MG 0.75-0.75-0.75
50	12	FEMALE		YES		75	65.9	0	0	0	0	0	0	10	NORMAL	CONVULSIVE	10 YEARS	10 MIN	RARELY	2 YEARS BACK	POLY	2 YEARS	LEVITIRACETAM 250MG 1-1-1

1	7	MALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
2	8	MALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
3	9	MALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
4	10	MALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
5	11	MALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
6	11	MALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
7	8	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
8	10	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
9	12	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
10	9	FEMALE			YES	69	30.45	89	28	3	9	10	6	0	ABNORMAL
11	7	MALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
12	7	MALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
13	8	MALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
14	10	MALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
15	8	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
16	9	FEMALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
17	10	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
18	11	FEMALE			YES	75	89.54	0	0	0	0	0	0	10	NORMAL
19	12	FEMALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
20	9	MALE			YES	69	30.45	90	26	3	8	10	7	0	ABNORMAL
21	9	MALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
22	8	MALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
23	7	MALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
24	7	MALE			YES	75	88.1	0	0	0	0	0	0	10	NORMAL
25	6	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
26	9	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
27	10	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
28	11	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
29	12	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
30	12	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
31	6	MALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
32	7	MALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
33	7	MALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
34	8	MALE			YES	69	25	100	29	3	9	10	7	0	ABNORMAL
35	8	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
36	9	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
37	10	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
38	10	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
39	11	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
40	12	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
41	8	MALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
42	9	MALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
43	9	MALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
44	10	MALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
45	6	FEMALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
46	7	FEMALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
47	7	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
48	8	FEMALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
49	11	FEMALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
50	12	FEMALE			YES	75	88.63	0	0	0	0	0	0	10	NORMAL
51	6	MALE			YES	75	88.18	0	1	0	0	0	1	10	NORMAL
52	7	MALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
53	10	MALE			YES	75	89.09	0	0	0	0	0	0	10	NORMAL
54	10	MALE			YES	75	86.36	0	1	0	0	0	1	10	NORMAL
55	11	MALE			YES	75	85.9	9	9	3	4	1	1	10	NORMAL
56	12	MALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
57	12	MALE			YES	75	87.7	0	1	0	0	0	1	10	NORMAL
58	7	FEMALE			YES	75	86.81	0	1	0	0	0	1	10	NORMAL
59	8	FEMALE			YES	75	86.81	0	0	0	0	0	0	10	NORMAL
60	9	FEMALE			YES	75	86.36	0	1	0	0	0	1	10	NORMAL
61	6	MALE			YES	75	44.54	68	16	1	6	4	5	5	ABNORMAL
62	8	MALE			YES	75	90.45	0	0	0	0	0	0	10	NORMAL
63	9	MALE			YES	75	88.1	0	1	0	0	0	1	10	NORMAL
64	11	MALE			YES	75	87.27	0	0	0	0	0	0	10	NORMAL
65	12	MALE			YES	75	88.18	0	1	0	0	0	1	10	NORMAL
66	9	FEMALE			YES	75	86.36	0	1	0	0	0	1	10	NORMAL
67	10	FEMALE			YES	75	86.81	0	1	0	0	0	1	10	NORMAL
68	10	FEMALE			YES	75	86.81	0	1	0	0	0	1	10	NORMAL
69	10	FEMALE			YES	75	65.45	12	12	6	0	2	4	7	NORMAL
70	12	FEMALE			YES	75	89.54	0	1	0	0	0	1	10	NORMAL
71	6	MALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
72	8	MALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
73	9	MALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
74	9	MALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
75	10	MALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
76	12	MALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
77	8	FEMALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
78	8	FEMALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
79	10	FEMALE			YES	75	86.81	0	0	0	0	0	0	10	NORMAL
80	11	FEMALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
81	7	MALE			YES	75	87.27	0	0	0	0	0	0	10	NORMAL
82	8	MALE			YES	75	86.81	0	0	0	0	0	0	10	NORMAL

83	8	MALE			YES	75	31.81	79	26	2	6	10	8	2	ABNORMAL
84	9	MALE			YES	75	87.27	0	0	0	0	0	0	10	NORMAL
85	10	MALE			YES	75	87.27	0	0	0	0	0	0	10	NORMAL
86	7	FEMALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
87	8	FEMALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
88	9	FEMALE			YES	75	86.81	0	0	0	0	0	0	10	NORMAL
89	10	FEMALE			YES	75	86.81	0	0	0	0	0	0	10	NORMAL
90	11	FEMALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
91	8	MALE			YES	75	86.81	0	0	0	0	0	0	10	NORMAL
92	8	MALE			YES	75	86.81	0	0	0	0	0	0	10	NORMAL
93	9	MALE			YES	69	32.27	88	28	3	8	10	7	2	ABNORMAL
94	10	MALE			YES	75	86.81	0	0	0	0	0	0	10	NORMAL
95	12	MALE			YES	75	86.81	0	0	0	0	0	0	10	NORMAL
96	7	FEMALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
97	8	FEMALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL
98	10	FEMALE			YES	75	86.81	0	0	0	0	0	0	10	NORMAL
99	11	FEMALE			YES	75	86.81	0	0	0	0	0	0	10	NORMAL
100	12	FEMALE			YES	75	86.36	0	0	0	0	0	0	10	NORMAL